NEWARK BAY STUDY AREA

ADDITIONAL SITES AND CANDIDATE PRPS FOR THE NEWARK BAY STUDY AREA

VOLUME I OF II

PRP DATA EXTRACTION FORM AND EVIDENCE CONCERNING:

NUODEX INC.

PREPARED BY:
TIERRA SOLUTIONS, INC.

SUBMITTED TO:
USEPA REGION II

OCTOBER 18, 2006

S-85-8426

11 JUN 1985

NUODEX INC.
ELIZABETH, NEW JERSEY

GENERAL INFORMATION & SITE EVALUATION SUBMISSIONS FOR THE ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT (ECRA)

MAY 27, 1985

Volume I - ECRA Forms 1&2

with Appendices 1-8

pas PRINCETON AQUA SCIENCE

165 Fieldcrest Ave • CN 7809 • Edison New Jersey 08818-7809 • (201) 225-2000

959270003

BBA000001

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
BUREAU OF INDUSTRIAL SITE EVALUATION

Let's protect our earth

ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT (ECRA)

APPLICATION FOR ECRA REVIEW

SITE EVALUATION SUBMISSION

This is the second part of a two part application submittal and must be submitted within 30 days following public release of the decision to close operations or execution of an agreement of sale or option to purchase.

DATE 6-11-85

NAME OF APPLICANT Nuodex Inc.

ADDRESS 830 Magnolia Avenue

CITY OR TOWN Elizabeth ZIP CODE 07201

MUNICIPALITY Elizabeth COUNTY Union

SUBMIT THE FOLLOWING:

9. A scaled site map identifying all areas where hazardous substances or wastes have been or currently are generated, manufactured, refined, transported, treated, stored, handled or disposed, above or below ground.

IS THIS MAP ENCLOSED? X YES, (See Appendix #II) ___ NO See Note

10. A detailed description of the current operations and process at the industrial establishment organized in the form of a narrative report designed to guide the Department step-by-step through a plant evaluation, with particular emphasis on areas of the process stream where hazardous substances and wastes are generated, manufactured, refined, transported, treated, stored, handled or disposed on site, above or below ground. Please note that establishments which ceased production prior to December 31, 1983, but are subject to ECRA because of on-going storage beyond that date, must provide details on past operations.

IS THIS REPORT ENCLOSED? X YES, (See Appendix #III) ___ NO

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): ______

FOR DEP USE ONLY

DATE RECEIVED ______

NOTICE NUMBER ______

ECRA-2-5/84

959270004

11.A. A description of the types, age, construction material, capacity, contents, and locations of storage vessels, surface imppoundments, landfills, or other types of storage facilities, including drum storage, containing hazardous substances or wastes.

ARE THESE FACILITIES IDENTIFIED ON YOUR SITE MAP OR DESCRIBED IN A NARRATIVE REPORT? X YES, (See Appendix # IV) ___ NO

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): ______________________

11.B. The Department requires that satisfactory leak tests such as the Petrotite (formerly the Kent Moore test) or the Leak Lokator LD-2000 Test or Soil Borings be performed to verify the integrity of all underground tanks and that the results of such tests be submitted to the Department.

ARE THE RESULTS OF THE LEAK DETECTION TEST OR THE SOIL BORINGS ENCLOSED? ___ YES, (See Appendix # V) ___ NO

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): ______________________

12. A complete inventory of hazardous substances and wastes, including description and location of all hazardous substances or wastes generated, manufactured, refined, transported, treated, stored, handled or disposed on site, above and below ground, and a description of the location, types and quantities of hazardous substances and wastes that will remain on site. (Attach additional sheets if necessary.)

SEE ATTACHED LIST (APPENDIX VI)

MATERIAL	QUANTITY	LOCATION	STORAGE METHOD	TO REMAIN ON SITE (YES OR NO)

MATERIAL	QUANTITY	LOCATION	METHOD	TO REMAIN ON SITE (YES OR NO)

13. A detailed description, date and location on a scaled map of any known spill or discharge of hazardous substances or wastes that occurred during the historical operation of the site and a detailed description of any remedial actions undertaken to handle any spill or discharge of hazardous substances or wastes. (Attach additional sheets if necessary.)

IS THIS INFORMATION ENCLOSED? X YES, (See Appendix #VII) ___ NO

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): ____________

ARE THE SPILLS IDENTIFIED ABOVE INDICATED ON THE SCALED SITE MAP? X YES ___ NO

Separate Map

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): ______

14. A detailed sampling or other environmental evaluation measurement plan which includes proposed soil, groundwater, surface water, surface water sediment, and air sampling determined appropriate for the site. (This sampling plan must be developed in conformance with ECRA Regulations N.J.A.C. 7:1-3.14 et seq., and Quality Assurance Guidelines as developed by DEP, copies of which are enclosed.)

IS THE SAMPLING PLAN ENCLOSED? X YES, (See Appendix#VIII) ___ NO

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): ______

15. A detailed description of the procedures to be used to decontaminate and/or decommission equipment and buildings involved with the generation, manufacture, refining, transportation, treatment, storage, handling, or disposal of hazardous waste or substances including the name and location of the transporter, the ultimate disposal facility, and any other organizations involved.

IS THE DETAILED DESCRIPTION ENCLOSED? X YES, (See Appendix #IX) ___ NO

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): The plant will continue to run in the same manner, so no decontamination/decommissioning is required. However, a closure/post closure plan has been completed for the Mercury Department and a copy is attached.

16. Copies of all soil, groundwater and surface water sampling results, including effluent quality monitoring, conducted at the site of the industrial establishment during the history of ownership by the owner or operator, including a detailed description of the location, collection, chain of custody, methodology, analyses, laboratory, quality assurance/quality control procedures, and other factors involved in preparation of the sampling results;

ARE HISTORICAL RESULTS ENCLOSED? X YES, (See Appendix # X) ___ NO

IF YOU HAVE CHECKED "NO," STATE THE REASON(S): ______

17. If you currently have a Spill Prevention Control and Countermeasure Plan (SPCC) for this facility, enclose a copy with this submittal.

IS YOUR SPCC PLAN ENCLOSED? X YES, (See Appendix # XI)
___ NO, this facility is not required to have an spcc plan.

18. Please list any other information you are submitting: ____________________

____

____

____

Send complete information package to:

BUREAU OF INDUSTRIAL SITE EVALUATION
DIVISION OF WASTE MANAGEMENT
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
CN-028
TRENTON, N.J. 08625
ATTN: ECRA NOTICE SUBMISSION

Send this completed form to:

N.J. Department of Environmental Protection
Division of Waste Management
Bureau of Industrial Site Evaluation
CN 028
Trenton, New Jersey 08625

Attn: ECRA Initial Notice

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
BUREAU OF INDUSTRIAL SITE EVALUATION

Let's protect our earth

ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT
INITIAL NOTICE
GENERAL INFORMATION SUBMISSION

(This is the first part of a two-part application form. This information must be submitted within 5 days following public release of a decision to close operations or the signing of a sales agreement or option to purchase involving an Industrial Establishment as defined in N.J.S.A. 13:1K-6, the Environmental Cleanup Responsibility Act.)

Please refer to N.J.A.C. 7:1-3.7 et seq. before filling out this form. Answer all questions. Please print or type.

Date 6-11-85

1. A. Industrial Establishment

Name Nuodex Inc. Telephone No. (201)354-7006

Street Address 830 Magnolia Avenue

City or Town Elizabeth State NJ Zip Code 07201

Municipality Elizabeth County Union

B. Lot number Block #3 Block number Lots 8-1179, 8-1179A, 8-1178, 8-1202, 8-1210

C. Standard Industrial Classification (SIC) Number 2819

D. Current Owner

Name Nuodex Inc. Telephone No. (201)981-5000

Street Address Turner Place, P. O. Box #365

Municipality Piscataway State NJ Zip Code 08854

E. If the industrial establishment discharges to a publicly-owned treatment plant, provide the name and address of that facility.

Name Joint Meeting Maintenance Telephone No. (201)353-1313

Street Address 500 South First Street

Municipality Elizabeth State NJ Zip Code 07202

FOR DEP use only
Date Received ________
Notice Number ________

ECRA-1 5/84

F. Has an ECRA application been filed for this Industrial Establishment or location previously? No If so, when? ______ For what reason? ______

______

Final Disposition? ______

G. How is this Industrial Establishment heated?(gas,oil,electricity) Gas & Oil

2. Previous owner(s) and current address (es)(attach additional sheets if necessary).

Name	Current Address	Description of the Operation
Tenneco Chemicals, Inc. Formerly known as Heyden Newport Chemical Corp.	Park 80 Plaza West-One Saddle Brook, NJ 07662	Chemical Manufacturing
Heyden-Newport, Inc., Nuodex Products Company Division	No longer in existence	Chemical Manufacturing
Nuodex Products Co., Inc.	No longer in existence	Chemical Manufacturing

3. If the transaction initiating an ECRA review is the closure of operations, fill in the date of public release of the decision to close the facility and enclose a copy of the public announcement.

Date of the public release of the decision ______

Is the public release enclosed? ______ Yes ______ No

If you checked "no", state the reason(s) ______

______

______

4. If the transaction initiating an ECRA review is an agreement of sale or option to purchase, fill in the date of the execution of that instrument plus provide a copy of the document April 24, 1985

Name and address of the other parties to the transfer:

Name	Street Address and Municipality	Phone No.
Chemische Werke Huls A.G.	Postfach 1320	011-49-2365-491
	Lipper WEG 200	
	D-4370 MARL	
	Federal Republic of Germany	

Is a copy of the agreement of sale or option to purchase attached? X Yes ___ No

If you checked "no", state the reason(s) See Volume III

5. Actual date proposed for closure of operations or transfer of title April 30, 1985

6. Authorized agent designated to work with the Department.

Name Paul T. O'Brien *See Below

Street Address Turner Place, P. O. Box #365

Municipality Piscataway State NJ Zip Code 08854

Telephone No. (201)981-5049

7. List all federal and state environmental permits applied for and received at this facility (attach additional sheets if necessary).

___ Check here if no permits are involved.

*Also: Steven J. Picco
Greenstone & Sokol
226 West State Street
Trenton, NJ 08625
(609)393-0621

8. If applicable, identify all administrative orders, temporary or permanent injunctions, civil administrative penalties, civil penaltiers, or criminal actions concerning the environment issued against the facility during the last ten years.

_______ Check here if no enforcement actions involved

A. Date of Action 4/17/84

Section of Law or Statute violated Elizabeth City Code Chapter 38, Sec. 285B (6)

Type of Enforcement Action Notice of Violation

Description of the violation Odor from loading a tank truck with hot product

How was the violation resolved?

Balance of loading carefully monitored - There were no further odor problems

B. Date of Action 1/12/1983

Section of Law or Statute violated N.J.S.E. 13:1E-1

Type of Enforcement Action Notice of Violation

Description of the violation Failure to submit TSD facility Annual Report

How was the violation resolved? Company had changed hands. Nuodex filed required report. This eliminated the violation and no further action was taken by the state.

(Add additional pages, if necessary)

C. Date of Action 1/26/84; 6/31/81

Section of Law or Statute violated City of Elizabeth Chapter 28, Sec 281A

Type of Enforcement Action Notice of Violation

Description of the violation Smoke emission from boiler stack

How was the violation resolved?

Boiler controls adjusted which eliminated smoke.

D. Date of Action 2/18/81

Section of Law or Statute violated City of Elizabeth 118-5E (3)

Type of Enforcement Action Notice of Violation

Description of the violation pH too high on waste water discharge.

How was the violation resolved? Changed procedure on Mercury water treatment so that pH is checked prior to discharge.

E. Date of Action 11/14/80; 3/23/81/ 10/26/81/ 4/22/82/ 5/21/82; 7/14/82; 7/23/82; 12/9/82; 1/25/83; 2/8/83; 4/19/83; 9/1/83; 2/24/84; 11/20/84

Type of Enforcement Action Notice of Violation

Description of the violation Waste water discharge exceeded limits for oil and grease or heavy metals at various times.

How was the violation resolved?

Tried various procedural changes which failed; finally installed a pretreatment system which was completed in March, 1983. This eliminated the majority of the violations. The remaining violations in 1983 and 1984 mainly concern Mercury where we have a consistant disagreement between Joint Meeting's Lab and outside certified Labs.

F. Date of Action 7/15/82

Section of Law or Statute violated N.J. A.C. 7:27-8.3 (a) & (b)

Type of Enforcement Action Administrative Order

Description of the violation Company disagreed with state as to requirement for a permit for a 6,000 gallon underground storage tank.

How was the violation resolved?

Company filed for a permit which was approved by the state. This satisfied requirements of the administrative order.

G. Date of Action 9/16/1981

Section of Law or Statute violated 40CFR Part 112

Type of Enforcement Action Threat of enforcement actions

Description of the violation EPA wanted a separate SPCC plan-would not accept a combined SPCC/DPCC plan.

How was the violation resolved? Separate plan written. Approved by EPA and no enforcement action was taken.

H. Date of Action 2/18/1981

Section of Law or Statute violated City of Elizabeth 118-5E (8)

Type of Enforcement Action Notice of Violation

Description of the violation pH of water too high.

How was the violation resolved?

pH adjusted to proper limits, which eliminated violation.

9. NOTE:

A overall plot planincludingadetailed plan of the production area is attached as appendix II. However, it is only marked to show where hazardous waste are stored and treated. The number of materials classified as hazardous substance that are used at the Elizabeth site makes it impossible to mark out areas where they are generated, manufactured, refined, etc. In essence the entire plant site except for the parking lot on the north side of Magnolia Avenue is involved in the storage or handling of hazardous substances.

APPENDIX I

AIR POLLUTION CONTROL PERMITS

N.J. BUREAU OF AIR POLLUTION CONTROL

PERMITS

Permit Number	Date of Application	Date of Approval	Date of Expiration
045332	?	3/28/1980	3/28/1990
065379	5/26/1983	7/28/1983	7/28/1988
008184	2/14/1973	5/14/1973	5/14/1988
008315	2/14/1973	3/19/1973	5/17/1988
019463	4/16/1975	9/15/1975	9/15/1985
029727	5/27/1976	2/14/1977	5/4/1987
047462	6/24/1980	3/10/1981	3/9/1986
047463	6/24/1980	3/10/1981	3/9/1986
047464	6/24/1980	3/10/1981	3/9/1986
047465	6/24/1980	3/10/1981	3/9/1986
047466	6/24/1980	3/10/1981	3/9/1986
047467	6/24/1980	3/10/1981	3/9/1986
047468	6/24/1980	3/10/1981	3/9/1986
047469	6/24/1980	3/10/1981	3/9/1986
047470	6/24/1980	3/10/1981	3/9/1986
047471	6/24/1980	3/5/1981 (temporary)	5/13/1985
048538	1/12/1981	10/19/1981 (temporary)	6/20/1985
044123	?	?	Superceded by #043588
CT8183	?	5/14/1973	Superceded by #019463
Nuosept 95 Drumming	1/28/1985	Awaiting approval.	
Nuosept 95 Reactor Vent	1/28/1985	Awaiting approval.	

APPENDIX II

SITE MAP

APPENDIX III

PROCESS OPERATIONS

The majority of the products made by the Elizabeth facility are classified as metal soaps. These are produced by the reaction of a metal oxide or hydroxide with an organic acid.

$$M(OH)_2 + 2RCOOH \quad M(HOOC)_2 + 2H_2O$$

These soaps are used as driers for paints, catalysts, fuel oil additives, PVC stabilizers and fungicides. The metals currently used at Elizabeth are cobalt, zirconium, calcium, lead, zinc, copper, manganese, nickel, bismuth, potassium, cadmium, barium and mercury. The main organic acids are naphthenic acid (crude and distilled), 2-ethyl hexoic acid, cekanoic acid and isononanoic acid. The reaction is carried out in a solvent medium - either mineral spirits or hi-flash naphtha. Certain other chemicals are used to keep the soaps in solution, control viscosity and adjust specific gravity.

The general procedure followed is to meter in the solvent and acids to a reactor. The $M(OH)_2$ or MO* is then added. The batch is then heated slightly and the reaction is allowed to go to completion. The heat is then raised further and a vacuum applied to the reactor to remove the water of reaction. A two phase mixture of water and solvent is recovered in a condenser and collected in a receiver. The solvent layer is held and recycled back to dark colored batches (cobalt and copper). The water layer is dropped to the plant sewer system. After drying, filter clay is added and the batch is filtered through a plate and frame filter press to a holding tank. It is then analyzed by the Lab and adjustments are made with solvent or other materials to bring the metal concentration and other specifications into range. It is then pumped out to a bulk storage tank or drummed.

The Drier Department is the largest manufacturing area and produces all items except the PVC stabilizers and mercury fungicides. There are a total of 15 reactors, which are dedicated to certain products broken down by metals and several holding tanks. The products and procedures are detailed as follows.

Calcium - these are produced in reactor D-1 and consist of the naphthenate and octoates with a metal strength of 4% to 6%. The metal source is calcium hydroxide and the reaction procedure is exactly as outlined above.

Cobalt - these are produced in reactors D-3, D-6 and D-13 and consist of the naphthenate and octoates. Reactor D-3 is dedicated to a high cobalt containing paste. This is produced by slurrying cobalt hydroxide with water. The slurry is then partially reacted with naphthenic acid. The water is dried off and the product is drummed directly from the reactor without filtration.

The primary cobalt products (naphthenate and octoates) are produced by the DMR (Direct Metal Reaction) process. In this process, pure cobalt metal powder is used. After the solvent, acid and metal are charged, the reactor is closed and air is blown through a sparger on the bottom. After the reaction is complete, the air is turned off and the balance of the process is the same. However, due to the price of cobalt, the press cake is washed with solvent and air blown after the filtration is completed. The resulting solution is adjusted and sold. Also, the press cake is recharged to a reactor when enough is accumulated and a 6% cobalt naphthenate is produced. The press cake from the filtration of the second reaction is discarded.

*Metal Hydroxide or Oxide.

Zirconium - these are produced in two stages in reactors C-1 and D-10 and only the octoates are produced. The reaction step is carried out in C-1 where zirconium carbonate paste (60% water) is reacted with 2-ethyl hexoic acid in mineral spirits. After the reaction is complete, the batch is allowed to settle. This allows the water (from the paste and reaction) to form a separate layer. The organic soap layer is pumped over to D-10 where the drying and filtration are completed. The water layer is dropped to the plant sewer system.

Lead - these are produced in D-2 and D-10 and consists of naphthenic and octoates. Reactor D-2 is dedicated to a lead naphthenate paste. Both litharge (lead oxide) and lead carbonate are used for the metal. These are partially reacted with naphthenic acid. The product is drummed directly from the reactor without filtration.

The major lead products are produced in D-10 by reacting litharge with either naphthenic or 2-ethyl hexoic acid. The procedure follows the general one outlined at the beginning. To avoid lead exposure, the litharge is stored in a bulk hopper. The proper amount is weighed out and slurried with mineral spirits. This slurry is then pumped into the reactor, completely avoiding operator exposure. The press cake produced in the filtration step is placed in 55 gallon open head drums and sent out for disposal in an approved hazardous waste landfill.

Zinc - these are produced in reactor D-11 from zinc oxide and can be either naphthenates or octoates. They follow the general reaction procedure. However, they normally do not require filtration. On the rare occasion that filtration is required, the filter cake is placed in 55 gallon drums and sent out for disposal in an approved hazardous waste landfill.

Copper - these products are produced in reactors D-5 and D-6. We are going to run plant trials producing some of these products by the DMR process using copper powder. Currently they are all produced from copper hydroxide with naphthenic acid, oleic acid or 8-hydroxyquinoline. The general reaction procedure is followed. The press cake from the filtration is put in 55 gallon drums for disposal in an approved hazardous waste landfill.

Nickel - there is one octoate product which is produced in either D-6 or D-13 by the DMR process outlined under cobalt. Again, due to the price of the nickel powder, the press cake is charged back to a reactor and a low metal product for blending back into the original product is produced. The press cake from the second reaction cycle is put in 55 gallon open head drums for disposal in an approved hazardous waste landfill.

Bismuth - there is one octoate product which is made in D-1 by the DMR process. The press cake from the filtration is placed in 55 gallon open head drums for disposal in an approved hazardous waste landfill.

Manganese - these products are made in D-10 and consist of both naphthenic and octoates. The process follows the general procedure.

Nuosperse 657 - this product is made in C-1, but is not a metal soap. It is also not a reaction product, but a mixing operation with the main ingredients consisting of an alkyd resin, mineral spirits and tall oil fatty acid. The resulting product is filtered and pumped to a bulk tank prior to drumming.

Nuvis H.S. - this product also is not a metal soap and is produced in DIS-2, a high temperature reactor. This product is a reaction between stearic acid and tripentek. The reactor is heated with a Dowtherm boiler and hot oil system. After the reaction is complete, it is dropped into thin wall drums while molten. After cooling it is sent to an outside company to be ground into a powder and packaged in fiber drums. There is no filtration step.

Two new products are currently being relocated to Elizabeth from the Fords plant. The first of these is Nuosept 95, which will be produced in reactor C-2. In this process formaldehyde is charged to the reactor. Tris (hydroxymethyl)aminomethane is then added and allowed to react. The batch is cooled and pumped through a polishing filter to TF-33, the blend tank. The batch is then adjusted to specification with water and drummed or loaded into tote bins. The reactor is equipped with a water scrubber on the vent to reduce the emissions of formaldehyde.

The second product is Guaiacol "C", which will be produced in C-3. Guaiacol, o-Cresol and o-Isopropylphenol are charged to the reactor. The mixture is heated and vacuum is pulled. The product distills off and is condensed and collected in C-4, the receiver. From there it is drummed.

There are several other minor products and custom blends, but they do not deviate from the procedures already outlined.

The Vinyl Department produces PVC stabilizers and some drier products. The equipment consists of a reactor, holding tank, filter press and blend tank. The process is the same general one as outlined for the drier metal soaps. The specific products are as follows.

Calcium - a high metal content octoate produced in V-2 using calcium oxide. Since the water of reaction would react with the calcium oxide, methanol is added to tie up the water. During the drying step the methanol is stripped off and recovered. It is then sent to our Chestertown facility where it is burned in their boilers for its fuel value as approved by the State of Maryland. The balance of the process is the same as outlined previously.

Vinyl Intermediates - several metal soaps are produced for use in the PVC stabilizers. These are produced from cadmium, barium and zinc. Each of the reactions follows the general procedure. The press cake from each of these filtrations is put in 55 gallon open head drums for disposal in an approved hazardous waste landfill.

Vinyl Stabilizers - the actual vinyl stabilizer are custom blends that are made in V-4. These are made from various metal soap intermediates made at Elizabeth and other intermediates purchased outside. Each ingredient is weighed into the blend tank and then mixed thoroughly. The product is then drummed or pumped out to a tank truck. To prevent cross contamination, the blend tank is rinsed with solvent to clean it and the spent solvent is put into drums. This solvent is recycled where possible and sent to an approved incineration site where it cannot be recycled.

Nuosperse 700 - this is a water based dispersing agent which is a mixture of purchased intermediates and is produced in V-4, the blend tank.

The Mercury Department produces two mercury based fungicides. The equipment consists of four reactors, a filter press, a holding tank and a recovery tank. We currently start the process with mercury oxide, but have the option of producing our own oxide from mercury metal. The process is as follows.

Mercury oxide (not currently in operation) - mercury metal is charged to reactor M-4 where it is dispersed in water. It is recirculated around the reactor with a small pump and gaseous chlorine is gradually added. This produces mercury chloride, which is then reacted with caustic to produce the mercury oxide. The oxide is then water washed several times to reduce impurities and chlorides.

PMA-18 - the mercury oxide from the above process or purchased material is slurried with water in reactor M-2 (M-1 is identically equipped and acts as a backup). Benzene and acetic acid are charged and the reactor is heated and the pressure is raised to about 30 psig while it reacts. At the end of the reaction, the batch is cooling and vacuum applied to strip off excess benzene and acetic acid. The recovered benzene is recycled in the process. The resulting slurry is mixed with ethylene glycol and ammonia and then filtered through a pressure leaf filter. Igepal CO-630 and Igepal CO-730 are added to stabilize the solution. The product is then drummed.

Super Ad-It - the process is identical up to the completion of the stripping step. At this point, mineral spirits and dodecylsuccinic acid are added. The batch is then heated and vacuum applied to remove the water. The batch is cooled and hydrogen peroxide, mineral spirits and dodecylsuccinic acid are added. The batch is reheated and vacuum applied again. The batch is cooled again, precut with mineral spirits and filtered. After filtration, 2-ethyl hexanol and perchloroethylene are added and the product is drummed.

Mercury Recovery - all water used in the Mercury Department is collected in a separate sump. This water is batched treated in M-4 with sodium sulfide to precipitate the mercury. The water is then filtered and the pH adjusted. After approval from the Lab, it is discharged to the Joint Meeting sewer system.

All mercury press cakes and off-grade products are treated in the mercury recovery tank. These materials are reacted with caustic and aluminum chips to drop out the metallic mercury which is removed from the bottom of the tank for reuse. The resulting sludge is put in 55 gallon open head drums for disposal in an approved hazardous waste landfill.

The plant is set up to treat all process waste water prior to discharge to the Joint Meeting sewer system. The water is collected in a series of trench drains and sumps throughout the plant. It is pumped into TF-6, a separation tank. Any organic material floats to the top and overflows into TF-5 where it is held for incineration at an approved site. The water is pumped to TF-16 where it is held for treatment. The treatment process is the same as that given above for the Mercury Department water.

This facility has two warehouses. Attached to the main building is Warehouse I, which is used to store finished goods primarily in 55 gallon steel drums. Warehouse II is located on the north side of Magnolia Avenue and is used to store raw materials, non-flammable finished goods and operating supplies. The yard of Warehouse II is used to store drums of spent solvent for recycle or incineration, off-grade products and flammable raw materials.

The plant also has its own boiler house to provide steam for process use and building heat. It has three 250 HP oil fired boilers. These burn either #6 or #4 fuel oil, which is stored in underground tanks.

Reactors And Holding Tanks

Vessel	Size	Material of Construction	Use
D-1	1,100 gals.	Stainless Steel	Calciums, Bismuth
D-2	1,200 gals.	Stainless Steel	Nuact (Lead)
D-3	1,200 gals.	Steel	HR Cobalt
D-4	1,100 gals.	Aluminum	Copper filtrate receiver.
D-5	3,000 gals.	Stainless Steel	Copper
D-6	3,000 gals.	Stainless Steel	Cobalt, Copper, Manganese
D-7	1,700 gals.	Stainless Steel	?, "Crash" tank
D-8	1,700 gals.	Steel	Spare holding tank
D-9	1,140 gals.	Stainless Steel	Spare holding tank
D-10	2,700 gals.	Stainless Steel	Lead, Manganese, Zinc
D-11	3,000 gals.	Stainless Steel	Zirconium Lead, Zinc
D-12	3,200 gals.	Stainless Steel	Filtrate receiver for D-11.
D-13	2,600 gals.	Stainless Steel	Cobalt
DR-16	1,200 gals.	Stainless Steel	Calcium filtrate receiver.
DR-17	1,200 gals.	Stainless Steel	Manganese filtrate receiver.
DR-18	500 gals.	Stainless Steel	Weigh tank
DR-19	1,000 gals.	Stainless Steel	Recovered Mineral Spirits.
DR-20	1,000 gals.	Stainless Steel	Recovered Mineral Spirits.
DR-21	500 gals.	Stainless Steel	Weigh Tank
DR-24	1,000 gals.	Stainless Steel	Cobalt weigh tank
DR-25	1,000 gals.	Stainless Steel	Cobalt weigh tank
DR-26	1,000 gals.	Stainless Steel	Cobalt weigh tank
DR-31	1,500 gals.	Stainless Steel	Cobalt blowdown tank
DR-32	1,500 gals.	Stainless Steel	C.balt blowdown tank
C-1	4,600 gals.	Stainless Steel	Zirconium Nuosperse 657
C-2	3,000 gals.	Stainless Steel	Nuosept 95
C-3	750 gals.	Glass Lined	Guaiacol "C"
C-4	750 gals.	Glass Lined	Guaiacol "C" receiver
M-1	2,000 gals.	Stainless Steel	Mercury
M-2	2,500 gals.	Stainless Steel	Mercury
M-3	2,000 gals.	Glass Lined	Mercury chlorination
M-4	2,000 gals.	Glass Lined	Water treatment
M-17	2,500 gals.	Stainless Steel	Mercury filtrate receiver
Recovery Tank	1,500 gals.	Stainless Steel	Mercury Recovery
V-2	2,000 gals.	Glass Lined	Calcium, Cadmium, Barium, Zi
V-3	1,900 gals.	Glass Lined	Filtrate receiver for V-2
V-4	2,500 gals.	Stainless Steel	Vinyl Blend Tank
V-26	500 gals.	Stainless Steel	Weigh Tank

APPENDIX IV

STORAGE FACILITIES

A list of all bulk storage tanks and their contents is attached.

There are no surface impoundments or landfills located at the Elizabeth site.

The areas where hazardous wastes are stored are indicated on the drawing in Appendix II.

As noted under question 9, the areas where drums of hazardous substances are stored encompasses the entire plant. The location of specific items can be determined from Appendix VI.

Tank Number	Capacity Gallons	Material of Construction	Contents
1	30,000	Iron	Crude Naphthenic Acid (A-280)
2	20,000	S.S.	2-Ethyl Hexoic Acid (A-97)
3	5,000	Iron	Mineral Seal Oil S-535
4	5,000	Iron	Recovered Mineral Spirits
5	3,000	Fiber Glass	Spent Mineral Spirits
6	5,000	Iron	Organic Separator
7	15,000	Iron	Polyresin 4502 (I-161)
8-A	5,000	Iron	Tripropylene Glycol (S-165)
8-B	10,000	Iron	Kerosene (S-51)
9	6,000	Iron	Benzene (S-204) (Underground Tank)
10	6,000	Iron	Hi-Flash Naphthlene (S-159) (Underground Tank)
11	15,000	S.S.	Copper Oleate 4%
12	15,000	S.S.	Empty (Not Clean)
14	4,000	S.S.	Phenyl Didecyl Phosphite (S-291)
15	4,000	S.S.	Lubrizol 2106 (M-168)
16	10,000	Iron	Water Treatment Storage
-	10,000	Iron	Empty (Backup Fuel Oil)
18	15,000	Iron	Fuel Oil (Underground Tank)
19	15,000	Iron	Fuel Oil (Underground Tank)
20	15,000	Iron	Fuel Oil (Underground Tank)
21	10,000	S.S.	Methyl Ethyl Ketoxime
22	20,000	S.S.	I-161 (Grade 3)
23	4,000	Iron	Lead Octoate 24%
24	5,000	S.S.	Spent Solvent Storage
25	5,000	Aluminum	Flexol Plasticizer EPO (NX 849)
26	12,000	Iron	Sodium Hydroxide 30% (K-52)
27	12,000	Iron	Sodium Hydroxide 30% (K-52)
28	10,000	Iron	Nickel Octoate 10%
29	10,000	Iron	Calcium Octoate 6%
30	12,000	Iron	Manganese Octoate 9%
32	4,000	Aluminum	Acetic Acid (A-32)
33	3,000	S.S.	Nuosept 95
37	20,000	Iron	Lead Octoate 36%
38	20,000	Iron	Cobalt Octoate 12%
39	20,000	Iron	Crude Naphthenic Acid (A-280)
40	20,000	Iron	Lead Naphthenate 24%
41	20,000	Iron	Cobalt Naphthenate 6%
42	20,000	S.S.	Zirconium Octoate 18%
43	20,000	S.S.	Distilled Naphthenic Acid (A-47)
48	6,500	Iron	Drapex 4.4 (NX 850)
49	20,000	Iron	Mineral Spirits (S-434)
50	25,000	S.S.	2-Ethyl Hexoic Acid (A-97)
51	17,500	S.S.	Cekanoic Acid (A-282)
DIS 14	6,000	Iron	Fuel Oil #2 (Underground)
DIS 8	3,000	Iron	Spent Solvent

TANK NUMBER	CAPACITY GALLONS	MATERIAL OF CONSTRUCTIONS	CONTENTS
V-12	3,200	S.S.	Calcium Octoate 6% (I-205)
V-13	3,200	S.S.	Nonyl Phenol (S-149)
V-14	4,500	S.S.	Neodol 25 (S-513)
V-15	4,500	S.S.	Cadmium Octoate 16% (I-40)
V-16	6,500	S.S.	Diphenyl Decyl Phosphite (V-142)
V-17	6,500	S.S.	Barium Nonyl Phenate 14% (I-50)
V-18	6,500	S.S.	Oleic Acid (A-301)
V-19	4,500	S.S.	Zinc Paratertiary Butyl Benzoate 10% (I-162)
V-20	4,500	S.S.	Hydrolyzed Diphenyl Decyl Phosphite (I-63)
V-21	5,000	S.S.	Empty (Not Clean)
V-22	5,000	S.S.	A-200 Tall Oil Fatty Acid
Dr-79	750	Iron	Coray 40 (1502 Oil) (S-40)
Dr-78	750	Iron	Coray 40 (1502 Oil) (S-40)
Dr-77	750	Iron	Coray 40 (1502 Oil) (S-40)
Dr-76	1,200	Iron	Triton X-100 (S-173)
Dr-75	1,200	Iron	Hexylene Glycol (S-73)
Dr-74	1,200	Iron	Hexylene Glycol (S-73)
Dr-15	1,200	Iron	Triton X-100 (S-173)
Dr-14	1,200	Iron	Mineral Seal Oil (S-535)
Dr-13	1,200	Iron	Mineral Seal Oil (S-535)
Dr-19	2,000	Iron	Recovered Mineral Spirits
Dr-20	2,000	Iron	Recovered Mineral Spirits
Litharge Hopper	100,000 lbs.	Iron	Lead Oxide

APPENDIX V

RESULTS OF TANK TESTING

Underground tanks at this facility were precision leak tested using the Leak Lokator LD-2000 procedure. This was performed by Hunter Environmental Services, Inc. of Malvern, Pennsylvania.

The results of testing revealed all vessels to be free of leaks. The results of individual tank tests are included on the following pages.

SUMMARY OF TEST RESULTS

Worley

CATION: 500 Magnolia Ave

Elizabeth, NJ

LL-16 JR

DATE: 4/10/85

CUSTOMER: Worley

COPIES TO: Ray Pyllberg

SYSTEM	TANK SIZE		WATER INCHES	PUMP DISCHARGE PRESSURE TEST	LEAK LOKATOR RESULTS*			COMMENTS - RECOMMENDATIONS
	GALLONS	DIAMETER INCHES			LEVEL INCHES	GPH	CONCLUSION	
#4 fuel oil [illegible] tank	15,000	96	none	N/A Suction	115"	+.030	tight	
[illegible]	[illegible]	96"	none	N/A Suction	151	+.034	tight	
5204 Benzene	6000	96	none	N/A Suction	112"	+.029	tight	

DITIONAL COMMENTS:

ER CHARGES: (i.e., pumpovers, overtime, parts, etc.)

EVEL - INCHES FROM TANK BOTTOM TO TEST LEVEL
TH - ABSOLUTE LEAK RATE (MEASURED LEAK RATE - TEMPERATURE COMPENSATION) IN GALLONS PER HOUR
DK SI[illegible] NF[illegible] 329 AND OF [illegible] 05 [illegible] IS [illegible]ED [illegible] CER[illegible] T[illegible]INE[illegible].

PRELIMINARY REPORT

959270033

SUMMARY OF TEST RESULTS

OCATION: Nuodex / 830 Magnolia Ave / Elizabeth, NJ.

DATE: 5/3/85

CUSTOMER: Nuodex

COPIES TO: Ray Pyltlway

LL-16
JR.

SYSTEM	TANK SIZE GALLONS	TANK SIZE DIAMETER INCHES	WATER INCHES	PUMP DISCHARGE PRESSURE TEST	LEAK LOKATOR RESULTS* LEVEL INCHES	LEAK LOKATOR RESULTS* GPH	LEAK LOKATOR RESULTS* CONCLUSION	COMMENTS - RECOMMENDATIONS
#2 fuel oil	3000	64"	none	N/A Suction	84"	-.004	tight	
S-- Naptha	6000	96"	none	N/A Suction	115"	+.026	tight	
#6 fuel oil	15,625	96"	none	N/A Suction	148"	+.029	tight	

DDITIONAL COMMENTS:

HER CHARGES: (i.e., pumpovers, overtime, parts, etc.)

EVEL - INCHES FROM TANK BOTTOM TO TEST LEVEL
GPH - ABSOLUTE LEAK RATE (MEASURED LEAK RATE - TEMPERATURE COMPENSATION) IN GALLONS PER HOUR
CONCLUSION - NFPA 329 STANDARD OF .05 GPH IS USED TO CERTIFY TIGHTNESS

PRELIMINARY REPORT

959270034

5/6

HUNTER — Ray Pyl+loway — Leak Lokator

ENVIRONMENTAL SERVICES, INC.
10 GREAT VALLEY PARKWAY, SUITE 6
MALVERN, PA 19355
215-296-7380 800-523-4370

TEST RESULTS

DATE OF TEST: April 30 1985
CONTRACT NUMBER:

CUSTOMER: NUODEX
LOCATION — IDENTIFICATION NUMBER:
NAME:
ADDRESS: 830 MAGNOLIA
CITY: ELIZEBETH
STATE: NEW JERSEY

TEST RESULTS SUMMARY

NO.	SYSTEM PRODUCT	TANK SIZE GALLONS	TANK SIZE DIA/MATL	WATER INCHES	LEAK LOKATOR RESULTS* LEVEL INCHES	ALR GPH	CONCLUSION	RECOMMENDATIONS	CONCL. CODE TEST	TANK	SYS
1	#4 F.O. SPARE	15625	96	0	115	+0.030	T		T	T	
2	#6 Fuel oil	15625	96	0	151	+.2034	T		T		
3	#6 fuel oil	15625	96	0	148	+.029	T	Tested 5-3-85	T	T	T
4	S-204 Benzin	6000	96	0	112	+0.021	T		T		

OTHER INFORMATION:

~~FINAL REPORT~~

PRODUCT LINES — HYDROSTATIC PRESSURE TEST RESULTS

NO.	SYSTEM PRODUCT	TYPE OF PUMP REMOTE	TYPE OF PUMP SUCTION	# APPLIED	MINUTES APPLIED	PRODUCT LOSS CC'S	PRODUCT LOSS GPH	CONCLUSION/ RESULT
1	#4 fuel oil spare	N/A						N/A
2	#6 fuel oil	N/A						N/A
3	#6 fuel oil	N/A						N/A
4	S-204 Benzin	N/A						

NOTE: On suction systems, NEVER put more than 35 psi on any pump system.

OTHER CONTRACTORS, OFFICIALS, CUSTOMER REPRESENTATIVES PRESENT:

DETAIL OF TEST RESULTS

NO.	SYSTEM PRODUCT	TEST NO.	TEST LEVEL (INCHES)	TIME START	TIME DURATION	LEAK RATE CC/DIV	LEAK RATE CC/MIN	TEMPERATURE COMPENSATION Δ°F	TEMPERATURE COMPENSATION CC/MIN	ABSOLUTE LEAK RATE CC/MIN	ABSOLUTE LEAK RATE GPH	CHECK TEST
1	#4 F.O. SPARE	1	115	11:08	15 min	5.247	+2.557	+2.018	[illegible]	+4.818	+0.03	
2	#6 Fuel oil	1	151	11:14	23 min	18.217	[illegible]	+.659	[illegible]	+2.152	[illegible]	
3	#6 fuel oil	1	148	12:00	21 min	10.16	+22.45	+.044	+20.61	+1.84	+.029	N
			Tested 5-3-85									
4	S-204 Benzin	1	112	12:27	[illegible]	14.591	[illegible]	-0.77	[illegible]	[illegible]	[illegible]	

* LEVEL — INCHES FROM TANK BOTTOM TO TEST LEVEL
ALR — ABSOLUTE LEAK RATE (MEASURED LEAK RATE ± TEMPERATURE COMPENSATION) IN GALLONS PER HOUR
CONCLUSION — NFPA 329 CRITERION OF ± 0.05 GPH IS USED TO CERTIFY TIGHTNESS

CERTIFICATION — This is to certify that the above described tank systems were tested, using the HUNTER ENVIRONMENTAL SERVICES, INC. LEAK LOKATOR according to all standard operating procedures. Those indicated as tight meet the criterion established by the National Fire Protection Association Pamphlet 329 for Precision Testing.

TESTS CONDUCTED BY		CERTIFIED BY	
TEST VAN NO.: LL-16	TANK TESTING SPECIALIST: James Reeves	SIGNATURE: [signature]	DATE: 4-30
	TANK TESTING SPECIALIST: Jay Rosseller	NAME: James Reeves	TITLE: [illegible]

959270035

TANK AND LOCATION DATA

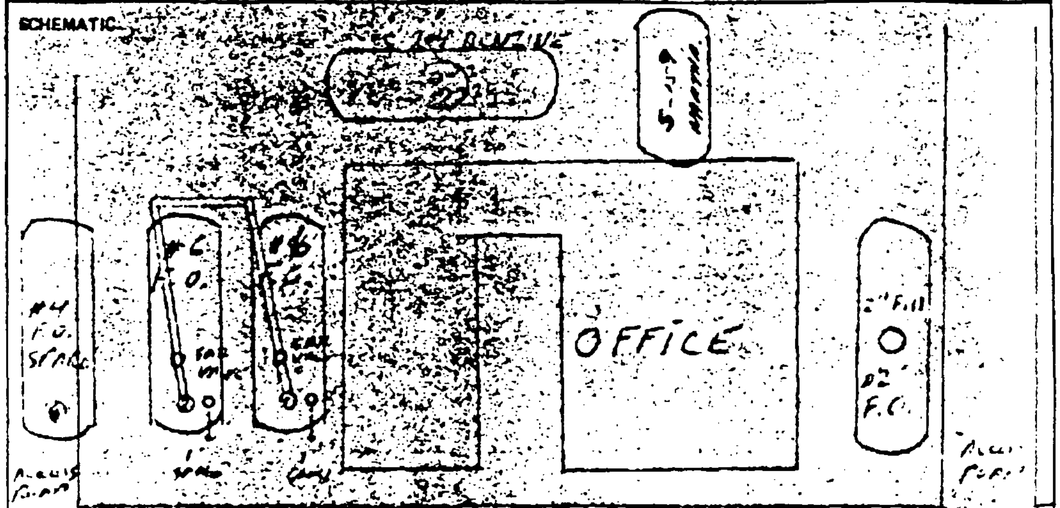
DATE: APRIL 30 1985

CUSTOMER: NUODEX CITY: ELIZABETH

I.D. # STATE: NEW JERSEY

WEATHER	TIME	TEMPERATURE	COMMENTS
BEFORE TEST	0845	52°	SUNNY
AFTER TEST			

SCHEMATIC



MAENZIA Tested 5-3-85

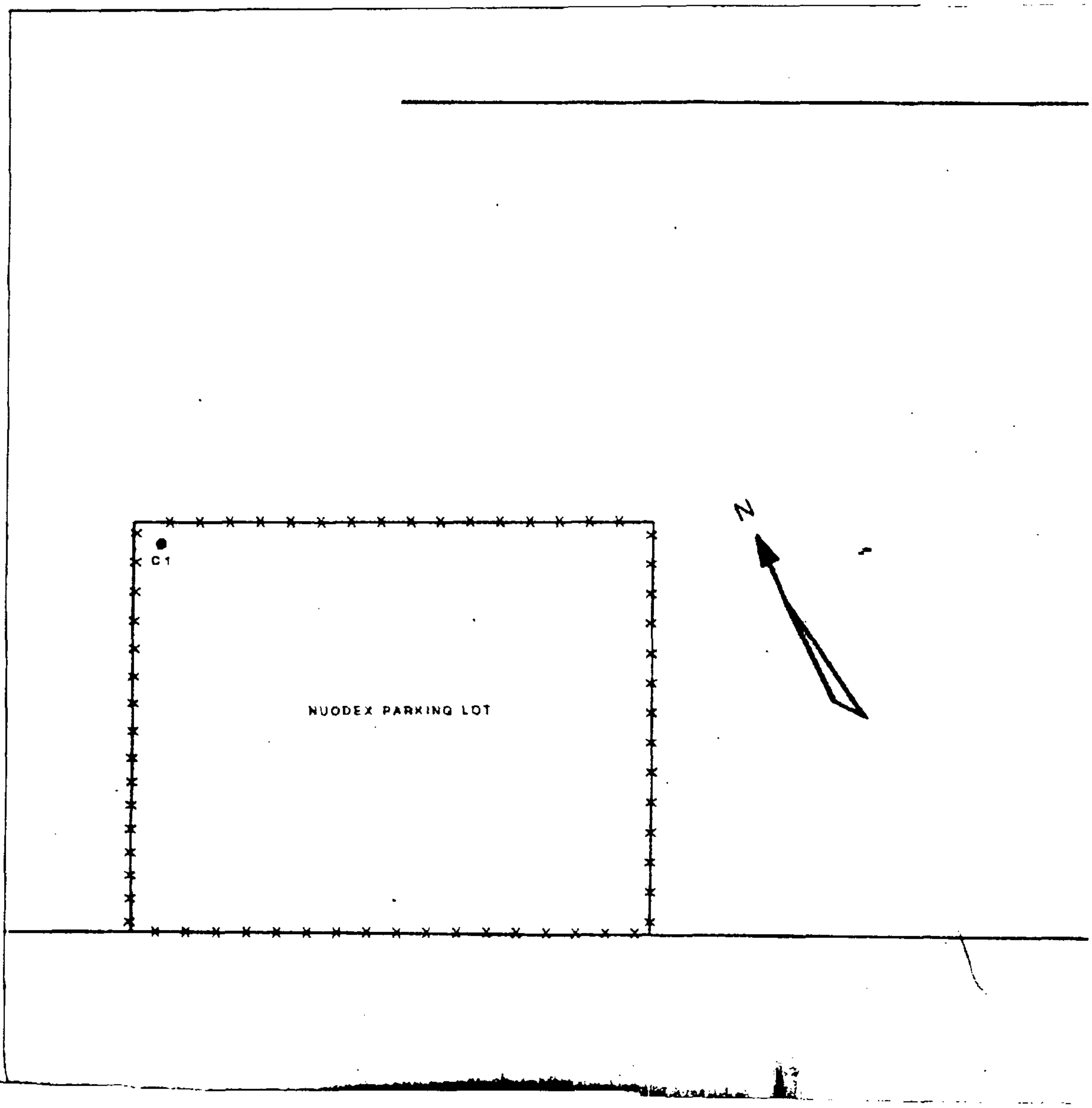
	PRODUCT/TANK NO.	#4 FO SPARE		#6 FU. OIL		#6 FU. OIL		S-24 BENZIN			
		Fill	Gauge	Fill	Gauge	Fill	Gauge	Fill	Gauge	Fill	Gauge
BEFORE DELIVERY	LEVEL										
	GALLONS										
	WATER	0		0	0	0	0	0			
	TOP OF RISER	123		157	159	151	156	148			
	GRADE	123		133	133	127	133	138			
	DROP TUBE	4155		NO	NO	NO	NO	NO			
	CAPACITY, GALLONS*	15625		15625		15625		6000			
	DIAMETER, INCHES	96		96		96		96			
	MATERIAL	STEEL		STEEL		STEEL		STEEL			
	PUMP TYPE	AYER		N/A		N/A		N/A			
	TYPE OF COVER	ASPH		ASPH		ASPH		CONC			
	AGE OF TANK										
	SIPHON	NO		NO		NO		NO			
	TANK OPENINGS	1-6		1-3	1-1	1-3	1-1	2	2		
	EXTRACTORS										
VAPOR RECOVERY	TYPE	NONE		NONE		NONE		NONE			
	VENT CONFIGURATION										
	P-V VENT VALVE TYPE										

REPLACEMENT PARTS: PART # DESCRIPTION QUANTITY PRICE

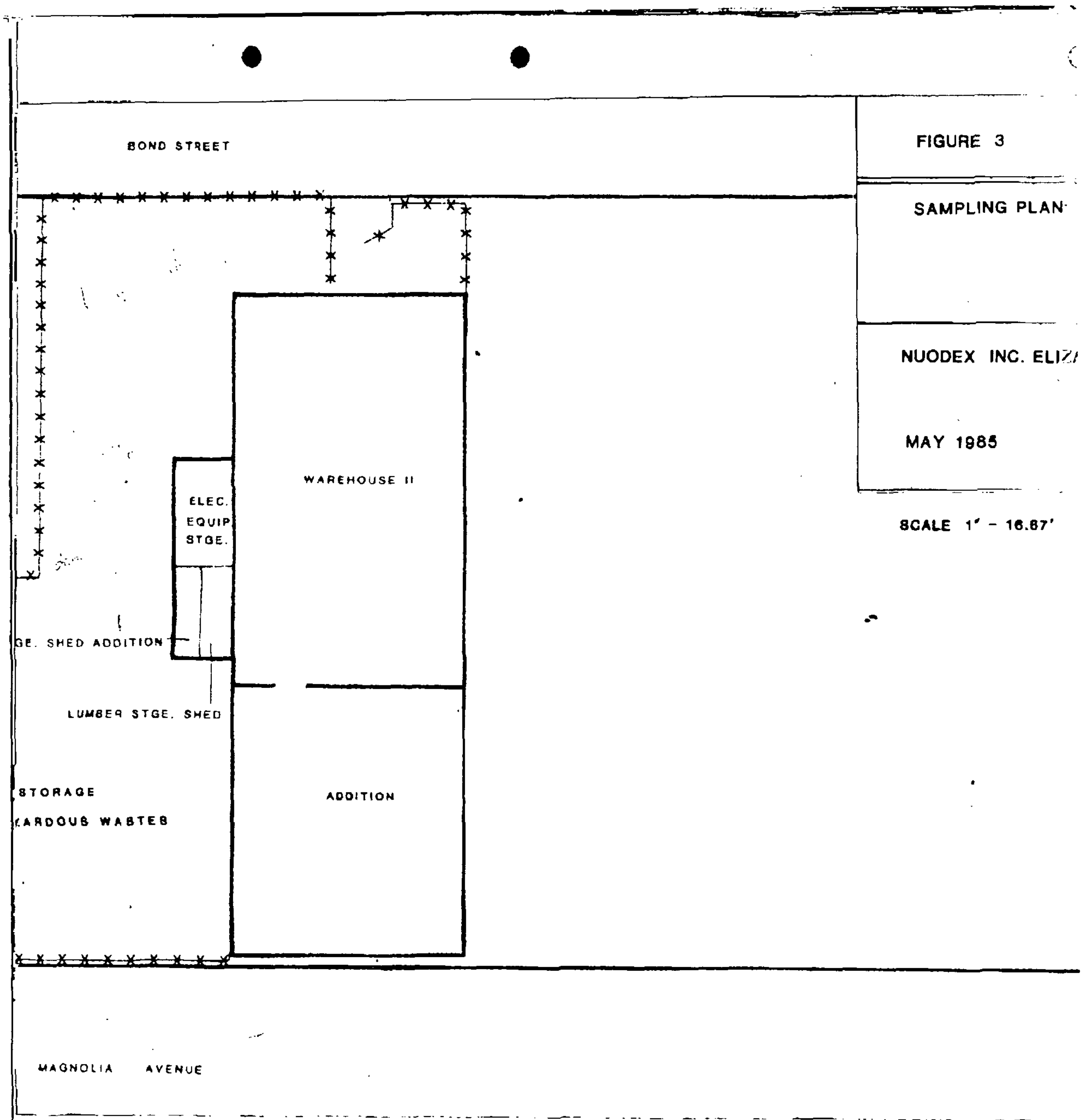
ADDITIONAL CHARGES: (manpower, overtime, etc.)

*Data obtained from: ☐ Station ☐ Lt. Charts ☐ Other

959270036



959270037


BOND STREET
FIGURE 3
SAMPLING PLAN
NUODEX INC. ELIZ
MAY 1985
SCALE 1" - 16.67'
WAREHOUSE II
ELEC.
EQUIP
STGE.
GE. SHED ADDITION
LUMBER STGE. SHED
STORAGE
ZARDOUS WASTES
ADDITION
MAGNOLIA AVENUE

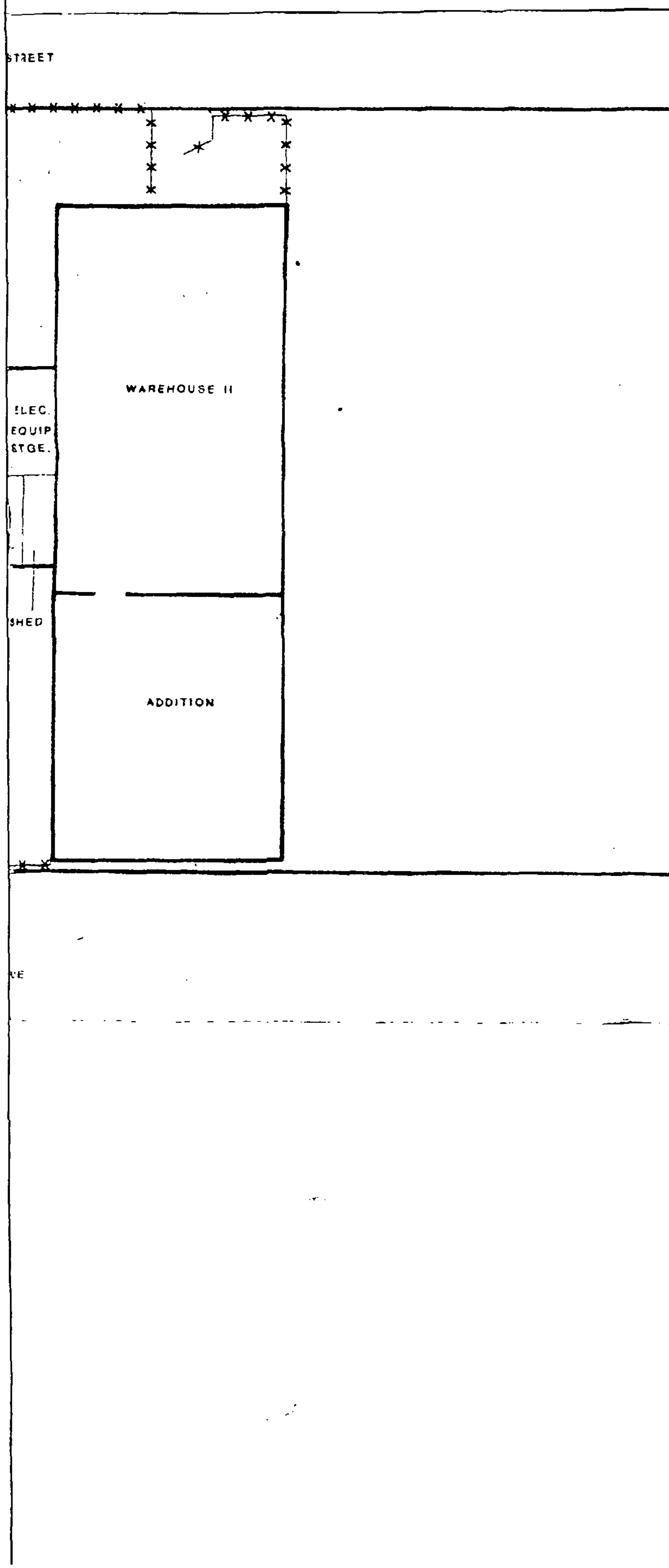


FIGURE 3

SAMPLING PLAN

NUODEX INC. ELIZABETH, NEW JERS

MAY 1985

SCALE 1" - 16.67'

LEGEND: TANK

FIGURE 3

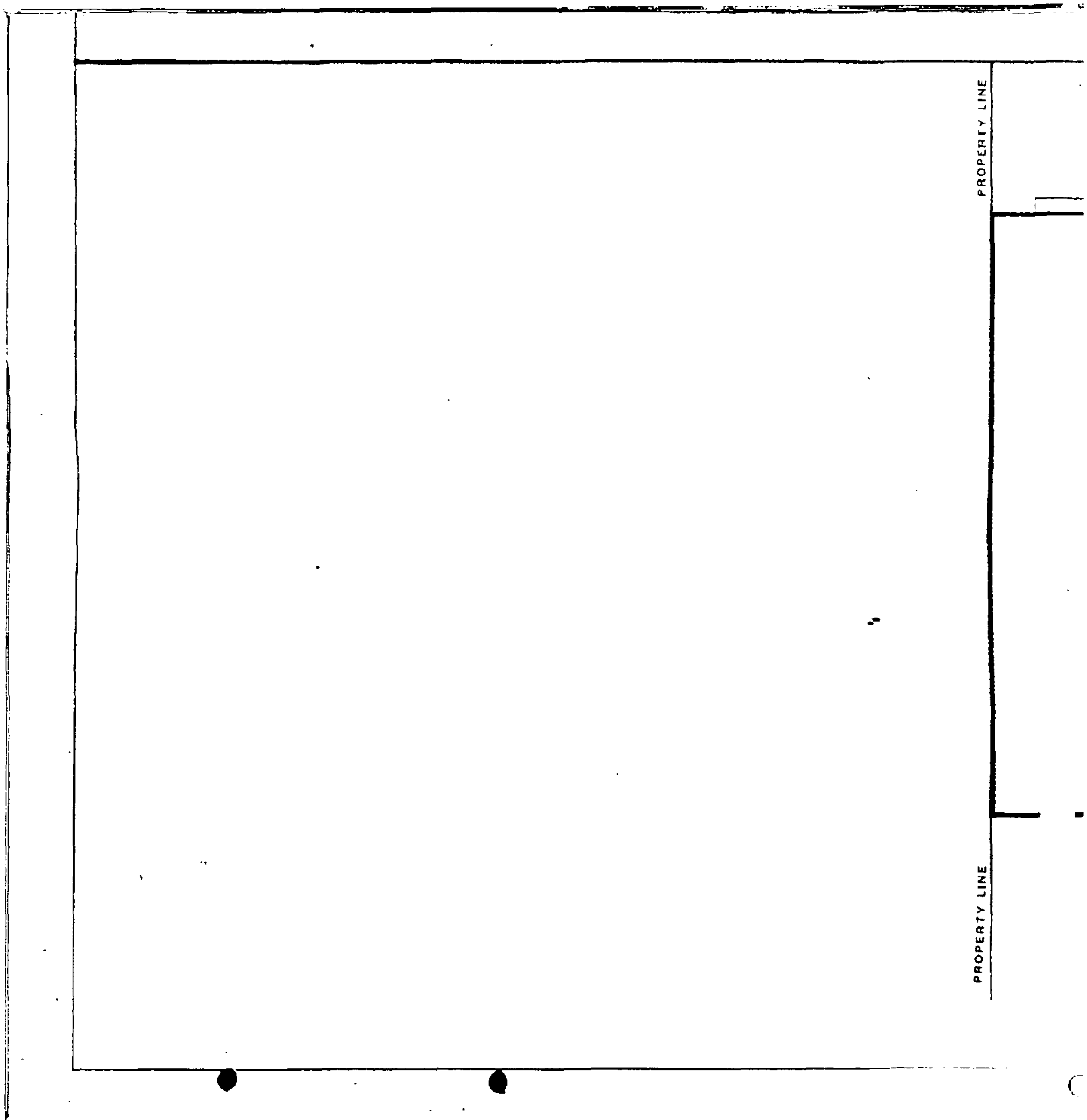
SAMPLING PLAN

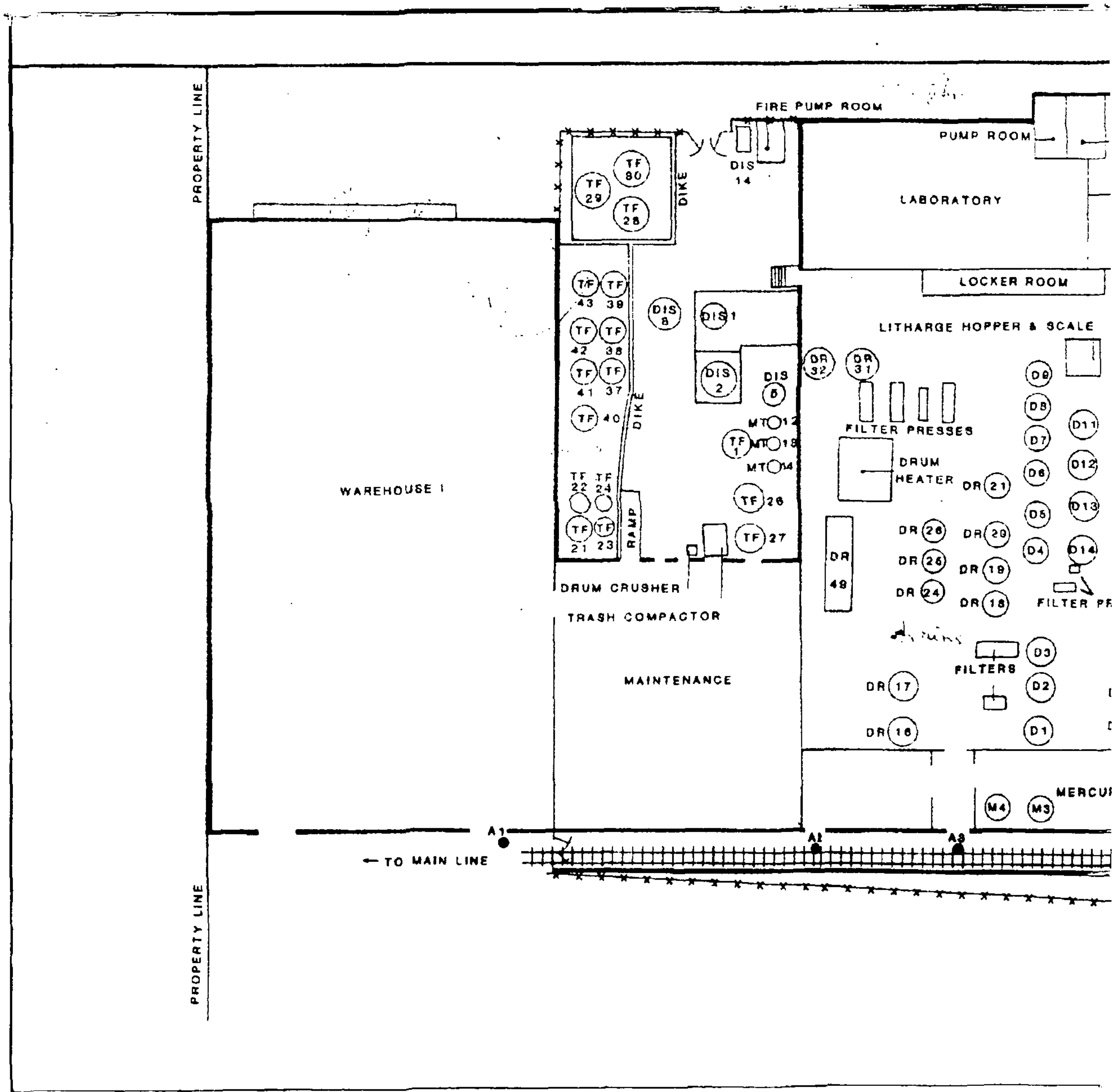
NUODEX INC. ELIZABETH, NEW JERSEY

MAY 1985

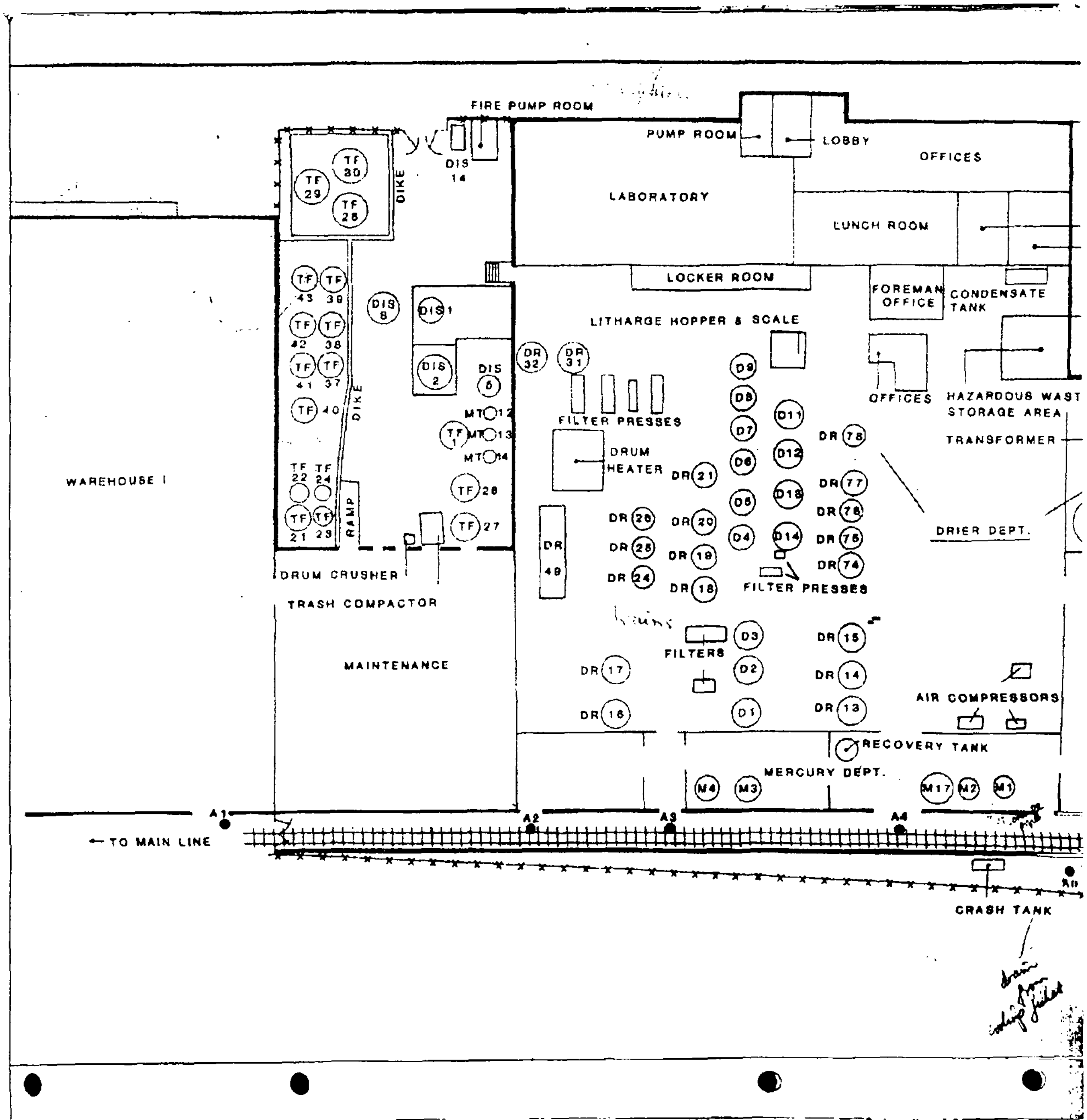
SCALE 1" - 16.67'

LEGEND: TANKS NOT TO SCALE

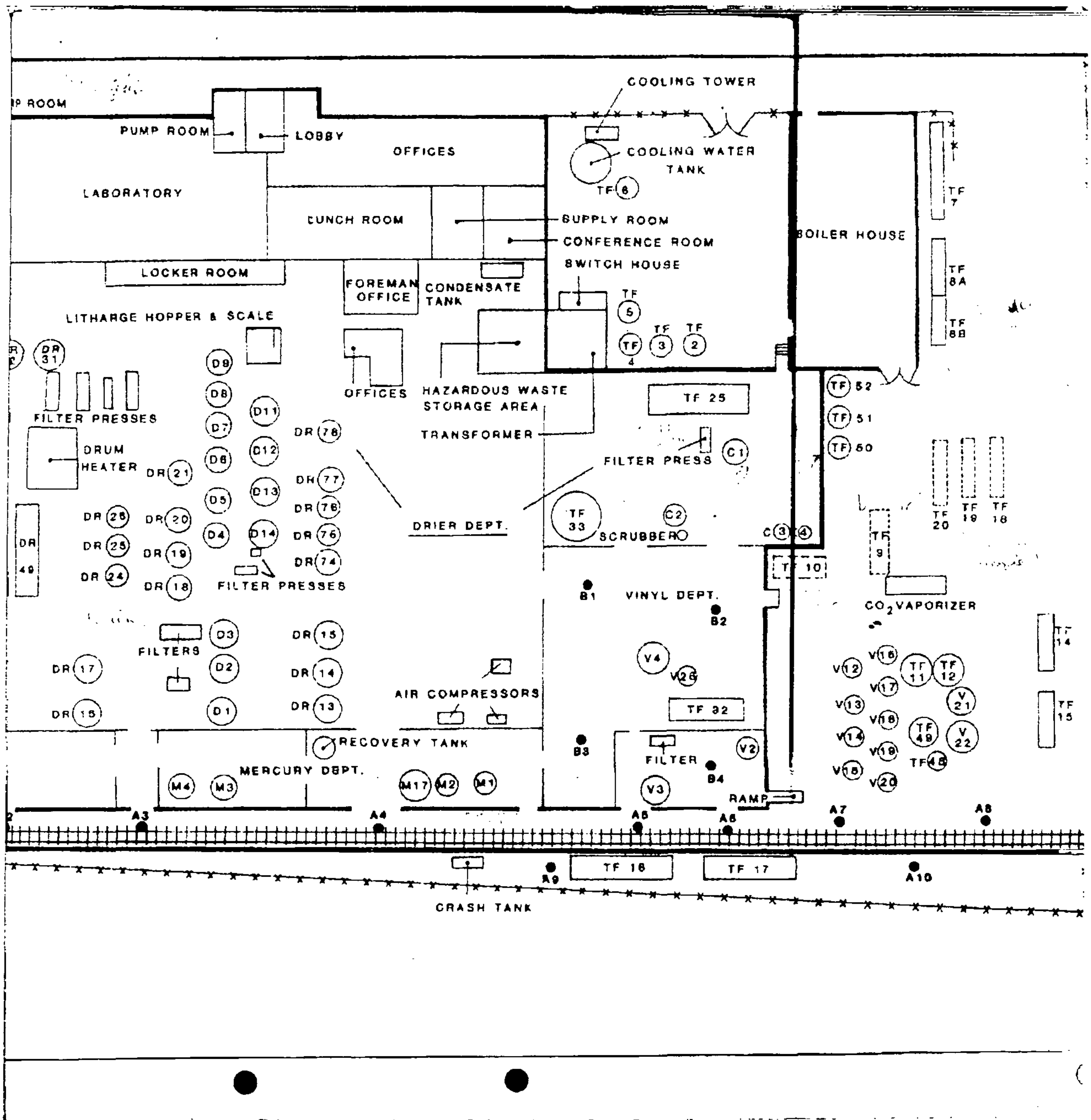

PROPERTY LINE
PROPERTY LINE


PROPERTY LINE
FIRE PUMP ROOM
PUMP ROOM
LABORATORY
LOCKER ROOM
LITHARGE HOPPER & SCALE
WAREHOUSE I
DIKE
RAMP
FILTER PRESSES
DRUM HEATER
FILTERS
DRUM CRUSHER
TRASH COMPACTOR
MAINTENANCE
← TO MAIN LINE
A1
A2
A3
PROPERTY LINE

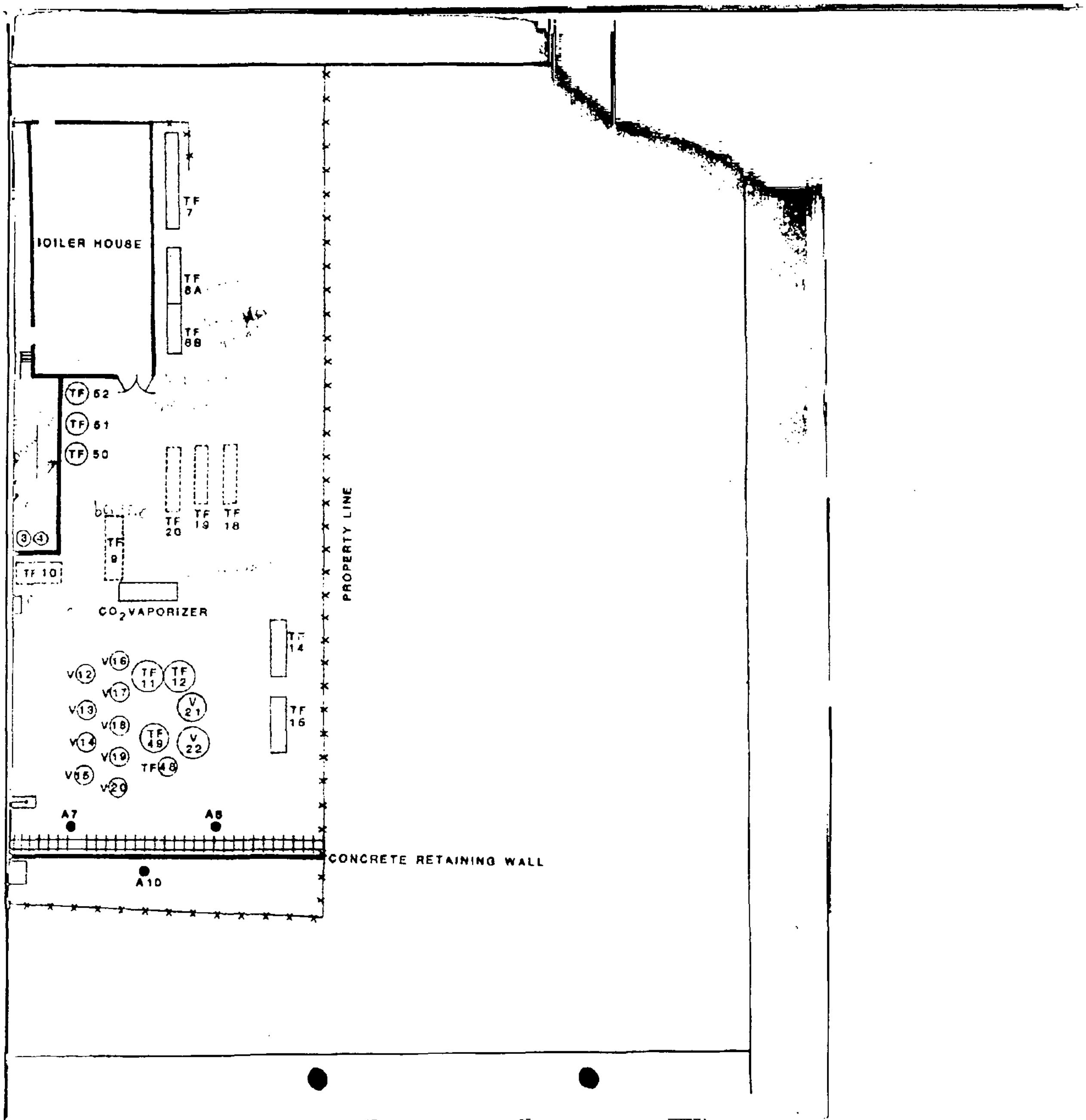
959270042


FIRE PUMP ROOM
PUMP ROOM
LOBBY
OFFICES
LABORATORY
LUNCH ROOM
LOCKER ROOM
FOREMAN OFFICE
CONDENSATE TANK
LITHARGE HOPPER & SCALE
OFFICES
HAZARDOUS WAST STORAGE AREA
TRANSFORMER
FILTER PRESSES
DRUM HEATER
DRIER DEPT.
WAREHOUSE I
DIKE
RAMP
DRUM CRUSHER
TRASH COMPACTOR
MAINTENANCE
FILTERS
FILTER PRESSES
AIR COMPRESSORS
RECOVERY TANK
MERCURY DEPT.
TO MAIN LINE
CRASH TANK

959270043


COOLING TOWER
PUMP ROOM
LOBBY
OFFICES
COOLING WATER TANK
LABORATORY
LUNCH ROOM
SUPPLY ROOM
CONFERENCE ROOM
BOILER HOUSE
LOCKER ROOM
SWITCH HOUSE
FOREMAN OFFICE
CONDENSATE TANK
LITHARGE HOPPER & SCALE
OFFICES
HAZARDOUS WASTE STORAGE AREA
FILTER PRESSES
DRUM HEATER
TRANSFORMER
FILTER PRESS
DRIER DEPT.
SCRUBBER
FILTER PRESSES
VINYL DEPT.
FILTERS
CO2 VAPORIZER
AIR COMPRESSORS
RECOVERY TANK
FILTER
MERCURY DEPT.
RAMP
TF 25
TF 32
TF 16
TF 17
CRASH TANK

959270044


BOILER HOUSE
TF 7
TF 8A
TF 8B
TF 52
TF 51
TF 50
TF 20
TF 19
TF 18
PROPERTY LINE
TF 9
TF 10
CO_2 VAPORIZER
TF 14
TF 15
V 12
V 13
V 14
V 15
V 16
V 17
V 18
V 19
V 20
TF 11
TF 12
V 21
V 22
TF 49
TF 48
A7
A8
CONCRETE RETAINING WALL
A10

5/4

Ray Pytlowa

HUNTER ENVIRONMENTAL SERVICES, INC.
15 GREAT VALLEY PARKWAY, SUITE 4
MALVERN, PA 19355
215-296-7300 800-523-4370

TEST RESULTS

leak lokator

DATE OF TEST: May 3, 1985
CONTRACT NUMBER:

CUSTOMER: Nuodex
LOCATION – IDENTIFICATION NUMBER:
NAME:
ADDRESS: 830 Magnolia
CITY: Elizabeth
STATE: New Jersey

TEST RESULTS SUMMARY

NO.	SYSTEM PRODUCT	TANK SIZE GALLONS	TANK SIZE DIA/MAT'L	WATER (INCHES)	LEVEL (INCHES)	ALR GPH	CONCLUSION	RECOMMENDATIONS	TEST	TANK	SYS
5	#2 F.O.	3000	64 Steel	0	64	-.004	T		T	T	T
6	S-159 Naptha	6019	96 Steel	0	115	+.026	T		T	T	T

OTHER INFORMATION:

FINAL REPORT

PRODUCT LINES – HYDROSTATIC PRESSURE TEST RESULTS

NO.	SYSTEM PRODUCT	TYPE OF PUMP REMOTE	TYPE OF PUMP SUCTION	PSI APPLIED	MINUTES APPLIED	PRODUCT LOSS CC'S	PRODUCT LOSS GPH	CONCLUSION/RESULT
5	#2 Fuel Oil	N/A						N/A
6	S-159 Naptha	N/A						N/A

NOTE: On suction systems, NEVER put more than 15 psi on any pump system.

OTHER CONTRACTORS, OFFICIALS, CUSTOMER REPRESENTATIVES PRESENT:

DETAIL OF TEST RESULTS

NO.	SYSTEM PRODUCT	TEST NO.	TEST LEVEL (INCHES)	TIME START	TIME DURATION	LEAK RATE CC/DIV	LEAK RATE CC/MIN	TEMPERATURE COMPENSATION Δ °F	TEMPERATURE COMPENSATION CC/MIN	ABSOLUTE LEAK RATE CC/MIN	ABSOLUTE LEAK RATE GPH	CHECK TEST Y/N
5	#2 Fuel Oil	1	64	940	90 min	1.47	+.224	+.006	+.521	-.297	-.004	N
6	S-159 Naptha	1	115	1330	35 min	76.41	+51.01	+.125	+29.33	+1.68	+.026	N

*LEVEL – INCHES FROM TANK BOTTOM TO TEST LEVEL
ALR – ABSOLUTE LEAK RATE (MEASURED LEAK RATE – TEMPERATURE COMPENSATION) IN GALLONS PER HOUR
CONCLUSION – NFPA 329 CRITERION OF ± 0.05 GPH IS USED TO CERTIFY TIGHTNESS

CERTIFICATION: This is to certify that the above described tank systems were tested, using the HUNTER ENVIRONMENTAL SERVICES, INC. LEAK LOKATOR according to all standard operating procedures. Those indicated as tight meet the criterion established by the National Fire Protection Association Pamphlet 329 for Precision Testing.

TESTS CONDUCTED BY		CERTIFIED BY	
TEST VAN NO.: LL-16	TANK TESTING SPECIALIST: James Reale	SIGNATURE: [signature]	DATE: 5-3-85
	TANK TESTING SPECIALIST: James Reale	NAME: Ray Pramski	TITLE: Tank Testing Specialist

TANK AND LOCATION DATA

DATE: May 3, 1985

CUSTOMER: [illegible] CITY: Elizabeth

I.D. [illegible] STATE: New Jersey

WEATHER	TIME	TEMPERATURE	COMMENTS
BEFORE TEST		55°	
AFTER TEST			

SCHEMATIC: See Page 2 of 2 from 4-30-1985

	PRODUCT/TANK NO.	#2 Fuel Oil		S-54 Naptha							
		Fill	Gauge	Fill	Gauge	Fill	Gauge	Fill	Gauge	Fill	Gauge
BEFORE DELIVERY	LEVEL										
	GALLONS										
	WATER	0		0							
	TOP OF RISER	40		152							
	GRADE	94		141							
	DROP TUBE	No		No							
	CAPACITY, GALLONS	5000		6000							
	DIAMETER, INCHES	60		96							
	MATERIAL	Steel		Steel							
	PUMP TYPE	—		—							
	TYPE OF COVER	Concrete		Conc							
	AGE OF TANK	—		—							
	SIPHON	—		—							
	TANK OPENINGS	1-2"		2-2"							
	EXTRACTORS	None		None							
VAPOR RECOVERY	TYPE	None		None							
	VENT CONFIGURATION	2"									
	P-V VENT VALVE TYPE										

REPLACEMENT PARTS: PART # DESCRIPTION QUANTITY PRICE

ADDITIONAL CHARGES: (hotel, meals, etc.)

*Data obtained from: ☐ Station ☐ L.L. Charts ☐ Other

APPENDIX VI

HAZARDOUS SUBSTANCES AND WASTES

Attached is a list of all hazardous substances and wastes handled at the Elizabeth Site. In addition to the locations listed, these items are all present in the production areas during the manufacture of the products they are used in. Actual quantities present vary and are generally less then the maximum quantities listed.

APPENDIX VI-A

HAZARDOUS SUBSTANCES

Material	Maximum Quantity	Location	Storage Method	Annual Throughput
#6 Fuel Oil	15,000 gals.	East Tank Farm	Underground Tank	365,000 gals.
#4 Fuel Oil	30,000 gals.	East Tank Farm	Underground Tank	3,000 gals.
#2 Fuel Oil	6,000 gals.	West Tank Farm	Underground Tank	1,500 gals.
Kerosene	10,000 gals.	East Tank Farm	Bulk Tank	110,000 lbs.
Acetic Acid	4,000 gals.	Plant-Vinyl Area	Bulk Tank	33,000 lbs.
Naphthenic Acid (Crude)	30,000 gals.	West Tank Farm	Bulk Tank	550,000 lbs.
Naphthenic Acid (Distilled)	20,000 gals.	West Tank Farm	Bulk Tank	430,000 lbs.
Benzene	6,000 gals.	East Tank Farm	Underground Tank	3,000 gals.
Benzene (Recovered)	1,000 gals.	Plant-Mercury Area	Bulk Tank	3,000 gals.
Sodium Hydroxide (30%)	24,000 gals.	West Tank Farm	Bulk Tank	125,000 lbs.
Cadmium Octoate 16%	4,500 gals.	East Tank Farm	Bulk Tank	150,000 lbs.
Copper Oleate 4%	15,000 gals.	East Tank Farm	Bulk Tank	60,000 lbs.
Nickel Octoate 10%	40,000 lbs.	West Tank Farm	Bulk Tank	200,000 lbs.
Lubrizol 2106 (Ba)	4,000 lbs.	East Tank Farm	Bulk Tank	100,000 lbs.
Ammonia	20,000 lbs.	Warehouse II & Plant	55 gal. drum	12,000 lbs.
Chlorine	2,000 lbs.	Plant	Cylinders	5,400 lbs.
Caustic (Flake)	4,000 lbs.	Warehouse II	Drums	170 lbs.
Dichlorobenzene	9,600 lbs.	Warehouse	55 gal. drums	25,000 lbs.
Formic Acid	4,000 lbs.	Warehouse II & Plant	55 gal. drums	6,000 lbs.
Formaldehyde (50%)	16,000 lbs.	Cat Room	Reactor	576,000 lbs.
Maleic Anhydride	11,000 lbs.	Warehouse II	50 lb. bags	0
Potassium Hydroxide	5,000 lbs.	Warehouse II	Drums	19,000 lbs.
Propionic Anhydride	8,000 lbs.	Warehouse II	55 gal. drums	28,000 lbs.
Sodium Bisulfite	400 lbs.	Warehouse II	50 lb. bags	0
Toluene	1,588 lbs.	Warehouse II Yard & Lab	55 gal. drums	13,600 lbs.
o-Cresol	40,000 lbs.	Warehouse II	55 gal. drums	33,750 lbs.
Cadmium Oxide	25,000 lbs.	Warehouse II & Vinyl area	5 gal. pails	38,000 lbs.
Copper Hydroxide	30,000 lbs.	Warehouse II & Drier area	50 lb. bags	65,000 lbs.
Copper Naphthenate 6%	13,600 lbs.	Warehouse I	Drums	60,000 lbs.
Copper Naphthenate 8%	23,000 lbs.	Warehouse I	Drums	260,000 lbs.

APPENDIX VI-A

HAZARDOUS SUBSTANCES

Material	Maximum Quantity	Location	Storage Method	Annual Throughput
Quindex	4,800 lbs.	Warehouse I	Drums	32,000 lbs.
Quindex Emulsion Base	1,000 lbs.	Warehouse I	Drums	13,000 lbs.
NX 1533	5,000 lbs.	Warehouse I	Drums	120,000 lbs.
Super Cat Copper 12%	2,000 lbs.	Warehouse I	Drums	10,000 lbs.
NX 2014	16,000 lbs.	Warehouse I	Drums	50,000 lbs.
Lead Oxide	90,000 lbs.	Plant & Warehouse II	Bulk Tank & Drums	360,000 lbs.
White Lead Carbonate	30,000 lbs.	Warehouse II	50 lb. Bags	5,350 lbs.
Lead Naphthenate 24%	80,000 lbs.	Tank Farm & Warehouse II	Bulk Tank & Drums	350,000 lbs.
Lead Octoate 24%	50,000 lbs.	Tank Farm & Warehouse I	Bulk Tank & Drums	150,000 lbs.
Lead Octoate 36%	150,000 lbs.	Tank Farm & Warehouse I	Bulk Tank & Drums	340,000 lbs.
E.P. Lead 30%	42,000 lbs.	Warehouse I & II	55 gal. Drums	150,000 lbs.
Mercury	30,000 lbs.	Mercury Area & Warehouse	76 lb. Flasks	4,000 lbs.
Mercury Oxide	20,000 lbs.	Warehouse II	Drums	40,000 lbs.
PMA-18 Phenyl Mercuric Acetate 18%	13,200 lbs.	Warehouse I	Drums	70,000 lbs.
PMA-60 Phenyl Mercury Acetate 60%	7,400 lbs.	Warehouse II	Drums & Boxes	45,000 lbs.
SAI Phenyl Mercury Dodecyl Succinate	75,200	Warehouse I	Drums	330,000 lbs.
Nickel	10,000 lbs.	Warehouse II	Drums	27,000 lbs.
Nickel Carbonate	4,000 lbs.	Warehouse II	50 lb. Bags	4,000 lbs.
Zinc Oxide	60,000 lbs.	Warehouse II	Drums	107,000 lbs.
Zinc Naphthenate 8%	2,000 lbs.	Warehouse I	Drums	335,000 lbs.
Zinc Naphthenate 10%	5,400 lbs.	Warehouse I	Drums	38,000 lbs.
Zinc Naphthenate 14.5%	20,000 lbs.	Warehouse I	Drums	35,000 lbs.
Zinc Octoate 8%	30,600 lbs.	Warehouse I	Drums	88,000 lbs.
Zinc Octoate 16%	22,000 lbs.	Warehouse I	Drums	135,000 lbs.
Zinc Octoate 18%	25,000 lbs.	Warehouse I	Drums	87,000 lbs.
Ammonium Nitrate	1,800 lbs.	Warehouse II	Drums	2,000 lbs.
Ammonium Formate	1,800 lbs.	Warehouse II	Drums	500 lbs.
Sodium SUlfide	10,000 lbs.	Warehouse II	Drums	2,600 lbs.
Hydrogen-Peroxide 50%	5,000 lbs.	Warehouse II	55 gal. Drums	1,300 lbs.

HAZARDOUS SUBSTANCES

Material	Maximum Quantity	Location	Storage Method	Annual Throughput
Isopropyl Alcohol	4,800 lbs.	Warehouse II Yard & Lab	55 gal. Drums	15,000 lbs.
Methanol	10,800 lbs.	Warehouse II Yard	55 gal. Drums	95,000 lbs.
n-Butanol	3,000 lbs.	Warehouse II Yard	55 gal. drums	8,400 lbs.
p-tert-butyl Benzoic Acid	4,000 lbs.	Warehouse II	50 lb. Bags	15,000 lbs.
Calcium Oxide	25,000 lbs.	Warehouse II	50 lb. Bags	82,000 lbs.
Mercaptobenzothiazole	3,500 lbs.	Warehouse II	50 lb. Bags	28,500 lbs.
Cellosolve	20,000 lbs.	Warehouse II Yard	55 gal. Drums	68,000 lbs.
Triethanol Amine	3,000 lbs.	Warehouse II Yard	55 gal. Drums	0
Triethyamine	3,000 lbs.	Warehouse II Yard	55 gal, drum	9,800 lbs.
Trifluoro Acetic Acid	10,000 lbs.	Warehouse II	55 gal. Drums	44,000 lbs.
Anderol 450	500 lbs.	Plant	55 gal. Drums	500 lbs.
Anderol 450	500 lbs.	Plant	55 gal. Drums	500 lbs.
Cook's EP 250 Gear Oil	500 lbs.	Plant	55 gal. Drums	500 lbs.
Terrestic 65	1,000 lbs.	Plant	55 gal. Drums	500 lbs.
Terrestic 52	1,000 lbs.	Plant	55 gal. Drums	500 lbs.
SAE 90 Gear Lube	500 lbs.	Plant	55 gal. Drums	500 lbs.
SAE 140 Gear Lube	500 lbs.	Plant	55 gal. Drums	500 lbs.

NOTE: ALL MATERIALS TO REMAIN ON SITE

HAZARDOUS WASTES

Material	Maximum Quantity	Location	Storage Method	To Remain On Site*
Methanol - Used	4,000 gals.	Warehouse II Yard	Drums	Yes
Spent Solvent	6,000 gals.	Warehouse II Yard	Drums	Yes
Lead Press Cake	5,000 lbs.	Plant	Drums	Yes
Copper Press Cake	5,000 lbs.	Plant	Drums	Yes
Zinc Press Cake	1,000 lbs.	Plant	Drums	Yes
Cadmium Press Cake	5,000 lbs.	Plant	Drums	Yes
Barium Press Cake	5,000 lbs.	Plant	Drums	Yes
Bismuth Press Cake	1,000 lbs.	Plant	Drums	Yes
Mercury Sludge	30,000 lbs.	Plant	Drums	Yes

*Ultimate disposal of all the items is in approved hazardous waste disposal sites, within 90 days.

APPENDIX VII

SPILL HISTORY

1.) In the Spring of 1981 an investigation was initiated as a result of seepage into the Cat Room pit. Samples taken in the area showed high levels of various metals. As a result a series of soil samples were taken and analyzed. The results of these showed that the soil along the railroad tracks and the crawlspace of the Vinyl Department had become contaminated with heavy metals (barium, cadmium, lead and mercury).

Princeton Aqua Science was hired as a consultant to determine the best remedial action. Further sampling was conducted which revealed that the entire plant area was underlain with very low permeability clay ($1x10^{-7}$ cm/sec).

Based on the investigation, the worst of the mercury contaminated soil was removed and sent to an approved hazardous waste landfill. A trench was then dug along both sides of the railroad tracks along the Mercury and Vinyl Departments. Tile drain pipes were installed and the trenches back filled. The drain lines were connected to a sump. The water that collects in this sump is pumped to tank TF-16 where it is held for treatment in the Mercury Department to remove any leached metals prior to discharge to the Joint Meeting sewer system.

Both the U.S. EPA and N.J. DEP were notified of the contamination at the time of discovery. The source of the contamination appears to be an accumulation of minor spills over the life of the plant (built 1938).

A copy of the PAS reports and results are attached.

2.) On June 20, 1980 an unknown person opened numerous valves in the East Tank Farm. Material from four tanks flowed onto the ground. The valves were shut immediately upon discovery and sand dikes formed to limit the flow of material. The following material was lost from the tanks.

Nuoplaz 850 (Plasticizer)	7,000 lbs.
Texanol Isobutyrate	2,400 lbs.
Neodol 25	5,100 lbs.
#6 Fuel Oil	1,834 gals.

Some of the material had already flowed into a sewer drain and into the Joint Meeting sewer system. They were notified and a cleanup contractor was sent to the treatment plant to capture and remove the material as it came into the sewer plant. The police and environmental agencies were notified of the spill. The material on the ground was collected on absorbent material and placed in 55 gallon drums for disposal.

A detailed internal investigation was conducted. While internal sabatoge was strongly suspected, no culprit was found. There was no environmental contamination since the majority of the area is covered with a concrete pad.

3.) On June 23, 1982 there was a spill of crude naphthenic acid. A railcar of naphthenic acid was being unloaded into TF-1. Due to an improperly calibrated Tank-O-Meter, the amount of available room was underestimated. As a result, the tank overflowed. About 200 gallons of material were lost. Most of the acid was collected immediately, but about 60 gallons flowed into the driveway trench drain to the Lab sump and out to the Joint Meeting sewer system. The area is all covered with a concrete pad so that no soil contamination occurred. The Joint Meeting and environmental agencies were notified. Due to the small amount of material, the Joint Meeting was able to process the material without problems.

4.) On January 15, 1981 there was a spill of kerosene. The spill occurred when the line at the bottom of the tank (TF-8B) froze and ruptured. Upon discovery of the leak the bottom valve was closed immediately and absorbent material spread out. Some of the material had already flowed down the east driveway and into the street. The street was flushed down with water to remove the kerosene that had soaked into the snow and ice. The material went into the Joint Meeting sewer system. The total loss was estimated at 420 gallons with about 275 gallons getting into the sewer system. All areas covered with kerosene were paved so no soil contamination occurred. The Joint Meeting and environmental agencies were notified at the time of the incident.

5.) On September 25, 1979 there was a spill of diesel oil. A tractor trailer from Rockaway Trucking was backing into Warehouse II when it hit a guard post embedded in concrete across the street. One fuel tank was ruptured and about 50 gallons of diesel fuel spilled onto the street. Absorbent material was immediately spread and the oil cleaned up. The Elizabeth Fire Department then washed the street and sand was spread to prevent slipping.

6.) On August 25, 1978 there was a spill of Nuodex Calcium 4% (calcium naphthenate). A batch was being filtered when the plate and frame filter press ruptured. The product overflowed the pan onto the floor and into the trench drains. The outlet of the trench drains were dammed, but approximately 235 pounds escaped into the Joint Meeting sewer system. The balance of the material was collected. The Joint Meeting and the state were notified.

Remedial Action

The actions taken to contain the spill listed #1 have been outlined. Operating procedures in the plant were also modified to prevent material from continuing to get into the area.

Spills of the type #2, #3, #4 and #6 could no longer get into the sewer system. The plant system has been modified so that all sumps feed into a 6000 gallon separation tank. The organic overflow from this goes to a 3000 gallon tank. Therefore, there is immediate holding capacity for 9000 gallons of material. There are also reactors and tanks available that could be used in an emergency so that even if our largest tank (30,000 gallons) failed while full, we would have capacity to hold the material.

PAS-81-5253E

INVESTIGATIVE ANALYSIS OF SELECTED SOIL SAMPLES

COLLECTED 5/8/80, 6/30/81, & 8/21/81

Elizabeth, New Jersey Facility

TENNECO

PAS PRINCETON AQUA SCIENCE

789 Jersey Ave., P.O. Box 151, New Brunswick, N.J. 08902 (201) [illegible]6-8800

959270058

SUMMARY OF ANALYTICAL INVESTIGATIONS

FROM 5/8/81 to 8/21/81

at

TENNECO CHEMICALS INC.

ELIZABETH, NEW JERSEY FACILITY

The analysis of selected soil samples from the Elizabeth, New Jersey facility of Tenneco Chemicals Inc. was performed by PAS as part of a preliminary investigation of potential contamination of soils at the plant site on May 8, June 30, and September 30, 1981 at the direction of Tenneco Chemicals Inc. The data that follows represents a series of soil samples obtained from surface grab samples and subsurface borings at the plant site at locations indicated by a sketch of the area provided by Tenneco Chemicals Inc. (see sketch).

Analysis of samples obtained on May 8, 1981 and provided by Tenneco Chemicals Inc. for cadmium, barium, zinc, mercury, and soil COD is indicated by the PAS data sheet contained herein. Samples 1 through 9 were samples taken of wall seeps of a subsurface room in the plant. Samples A, B, C, and D were taken from soils directly beneath the vinyl room floor of the facility. The reference sample was obtained from a soil sample taken on the property away from the plant buildings.

The analysis indicated that there was severe contamination of the soils beneath the vinyl room floor for all metals tested and all samples. Percent organic matter analysis (soil COD) confirmed organo-metal contamination. Based upon these results, a second sampling of soils away from the facility buildings but on the Elizabeth facility property was conducted on June 30, 1981.

Soil borings were taken and split spoon soil samples obtained at five locations along the rear property boundary of the property (see sketch sample points 1-5). Sample designations A, B, and C indicate depth of sample at 5, 10, and 15 feet, respectively. The analysis indicates some contamination of zinc, barium, and cadmium at the 5 ft. depth level. However, generally severe contamination was not apparent in these samples. Analysis for phenyl acetic acid and dodecyl succinic acid was below detectable limits.

On August 21, 1981 a series of five (5) soil borings were performed to obtain split spoon samples at 5, 10, and 15 foot depths (A, B and C) at a series of locations midway between the facility building and the back property line. In addition, seven (7) surface soil core samples were taken at the building wall. A PAS geologist was present for the soil boring operations to characterize soil types and collect samples for analysis. The analysis of soils for the metals of mercury, barium, cadmium, and lead indicated severe contamination of surface samples (11-17) near the facility building with highest concentrations located near access points (doorways) to the building. Borings numbered 6-10 at depths of 5, 10, and 15 ft. (A, B, and C, respectively) indicated contamination at 5 ft. with decreasing concentration with depth.

EP leachate testing of equal weight soil composites of samples 11-14 and 15-17 indicated leachable cadmium and barium with lead and mercury being tightly bound to the soil. Additionally, cation exchange capacity of the soils was evaluated for the 5 ft. depth of soil borings 6-10. Cation exchange capacity was deemed moderate to poor.

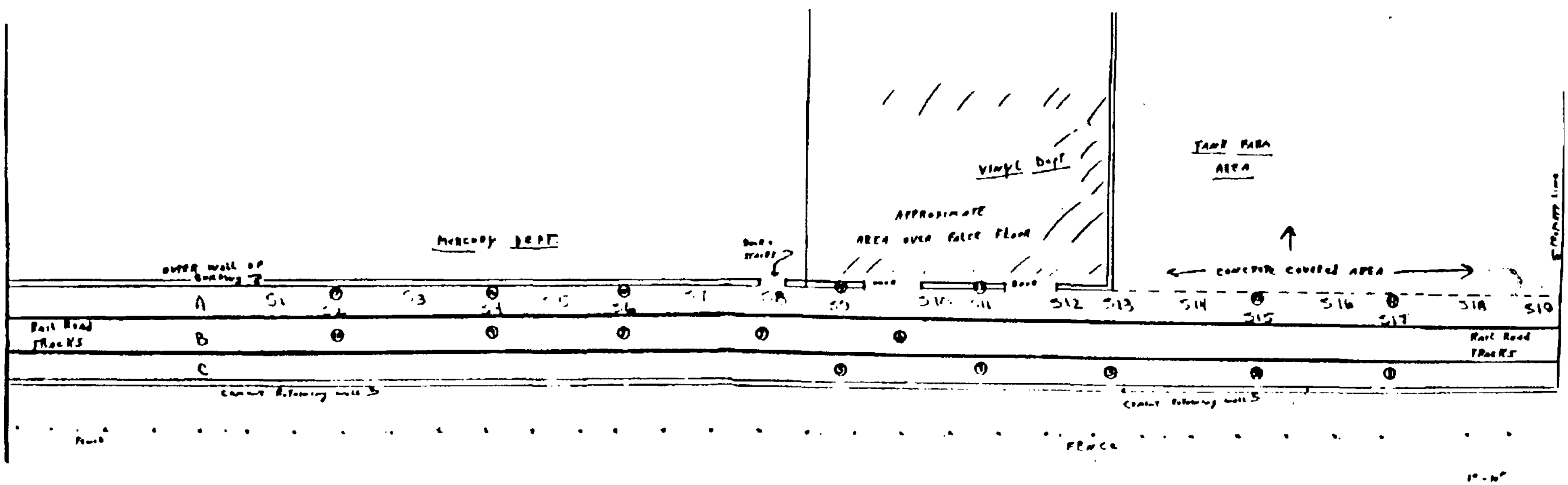
Geohydrologic evaluation indicated 1 to 2 ft. of fill over soft gray to stiff red clay. The permeability of the soil was measured to be 1×10^{-7} cm/sec. which is comparable to very low permeability clays used as barrier in secure landfills.

Generally, the data indicates a serious surface soil contamination at and in close proximity to the back wall of the facility building with some vertical migration. The soils are characterized to be low permeability clays under the site having the potential to hold the materials from movement off-site or migration vertically.

SKETCH

BORING AND SOIL SAMPLING LOCATIONS

TENNECO CHEMICALS INC.
ELIZABETH, NEW JERSEY FACILITY



Sketch provided by
Tenneco Chemicals Inc.

959270061

ANALYSIS OF SOIL SAMPLES

COLLECTED MAY 8, 1981

Company Tenneco Chemicals
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. John Saraka

Job #: 5253e
Date: 6/26/81
Auth.: 87968
Lot #: 314
Invoice #: 5910
Sample Date: 5/8/81

REPORT OF ANALYSIS

Sample No.	Cadmium (µg/g wet wt)	Barium (µg/g wet)	Zinc (µg/g wet)	Mercury (µg/g wet)	COD (as % Organic Carbon)
1	74	49	141	142	0.45
2	58	100	20	90	3.56
3	27	23	59	42	0.25
4	15	17	16	21	0.13
5	21	43	22	369	4.05
6	12	41	15	19	0.14
7	12	18	72	10	0.54
8	16	14	98	454	0.14
9	3	24	708	74	0.08
A	1,200	3,500	228	675	8.10
B	33,600	3,350	10,700	2,850	34.5
C	12,700	3,350	8,900	4,200	37.1
D	12,300	325	9,520	4,810	14.5
Reference	9	148	1,280	47	2.42
#2 Pit	29	32	70	209	-

ANALYSIS OF SOIL SAMPLES

COLLECTED JUNE 30, 1981

Company Tenneco Chemicals	Job #: 5253e
	Date: 7/31/81
Address 830 Magnolia Avenue	Auth.: 89041
	Lot #: 426
City Elizabeth State NJ Zip 07201	Invoice #: 5974
	Sample Date: 6/30/81
To Attn. of: Mr. John Saraka	

REPORT OF ANALYSIS

	Mercury	Zinc	Barium	Cadmium	% Solid
			µg/g (wet wt)		
1A	0.281	61.9	157	1.91	86.6
1B	0.676	69.0	91.6	0.924	87.2
1C	0.152	51.3	86.0	2.24	85.1
2A	0.107	69.2	48.0	0.240	85.8
2B	0.386	81.1	95.2	0.727	86.5
2C	<0.005	2.69	77.9	1.40	88.7
3A	0.376	102	134	0.299	82.2
3B	<0.005	62.5	67.1	0.119	86.2
3C	0.643	57.6	79.7	0.139	87.1
4A	0.468	57.9	149	0.849	81.6
4B	0.901	57.5	91	1.42	87.5
4C	0.456	60.9	108	0.807	87.8
5A	2.80	45.2	32.0	4.19	76.8
5B	0.499	52.7	54.0	0.597	85.3
5C	2.39	47.3	80.0	<0.080	97.0

Company Tenneco Chemicals

Address 830 Magnolia Avenue

City Elizabeth State NJ Zip 07201

To Attn. of: Mr. John Saraka

Job #: 5253e
Date: 7/31/81
Auth.: 89041
Lot #: 426
Invoice #: 5974
Sample Date: 6/30/81

REPORT OF ANALYSIS

	5A	5B	5C
		μg/kg (dry wt)	
Phenyl Acetic Acid	<50	<50	<50
Dodecyl Succinic Acid	<50	<50	<50

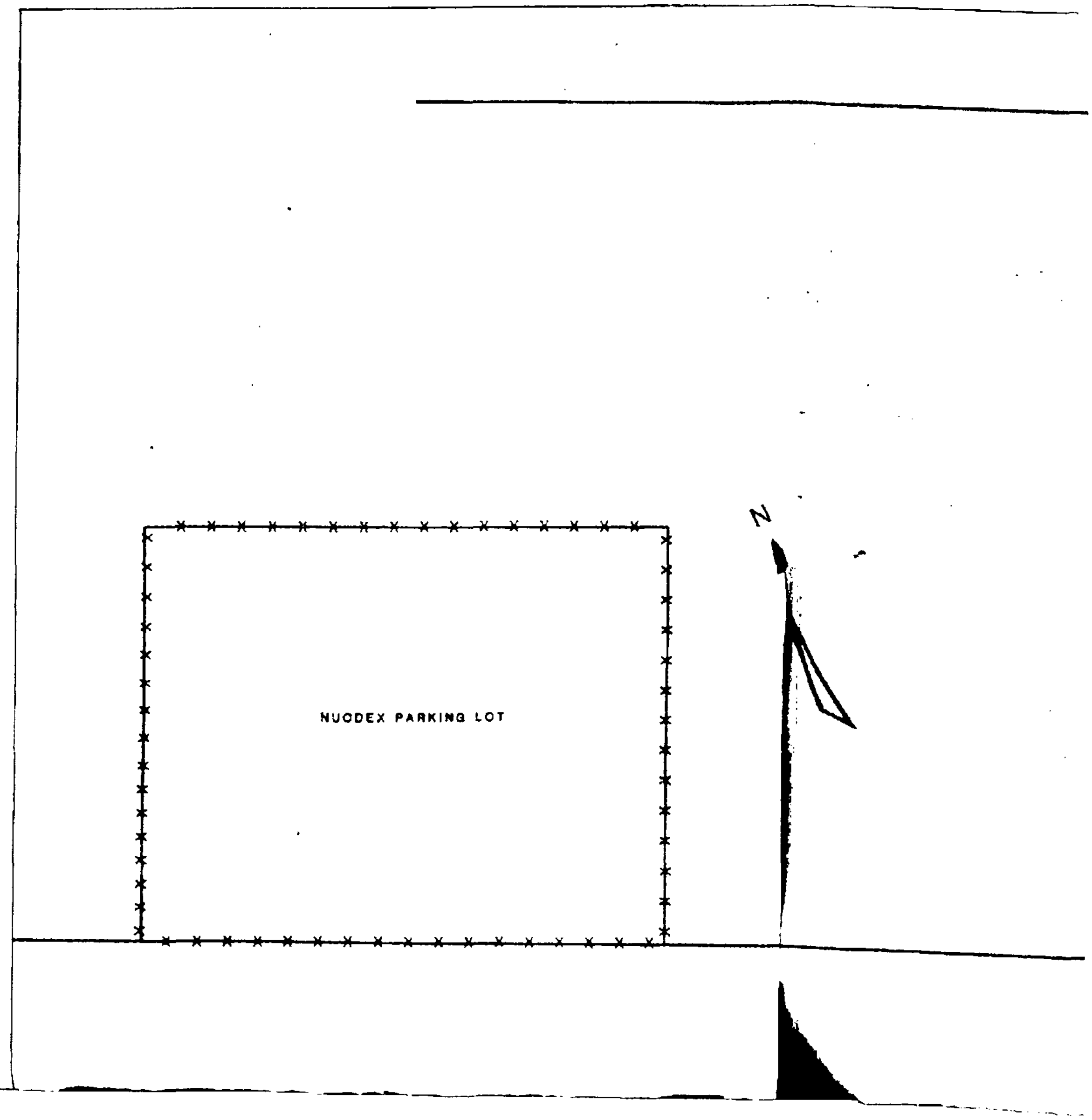
ANALYSIS OF SOIL SAMPLES
COLLECTED AUGUST 21, 1981

Company Tenneco Chemicals
Address P.O. Box 365
City Piscataway State NJ Zip 08854
To Attn. of: Mr. Martin Buys

Job #: 5253d
Date: 9/11/81
Auth.: PO 91948
Lot #: 548
Invoice #:
Sample Date: 8/21/81

REPORT OF ANALYSIS

Sample #	Cation Exchange Capacity (milliequivalants/100g)
6A	13.4
7A	15.4
8A	14.5
9A	13.2
10A	13.2



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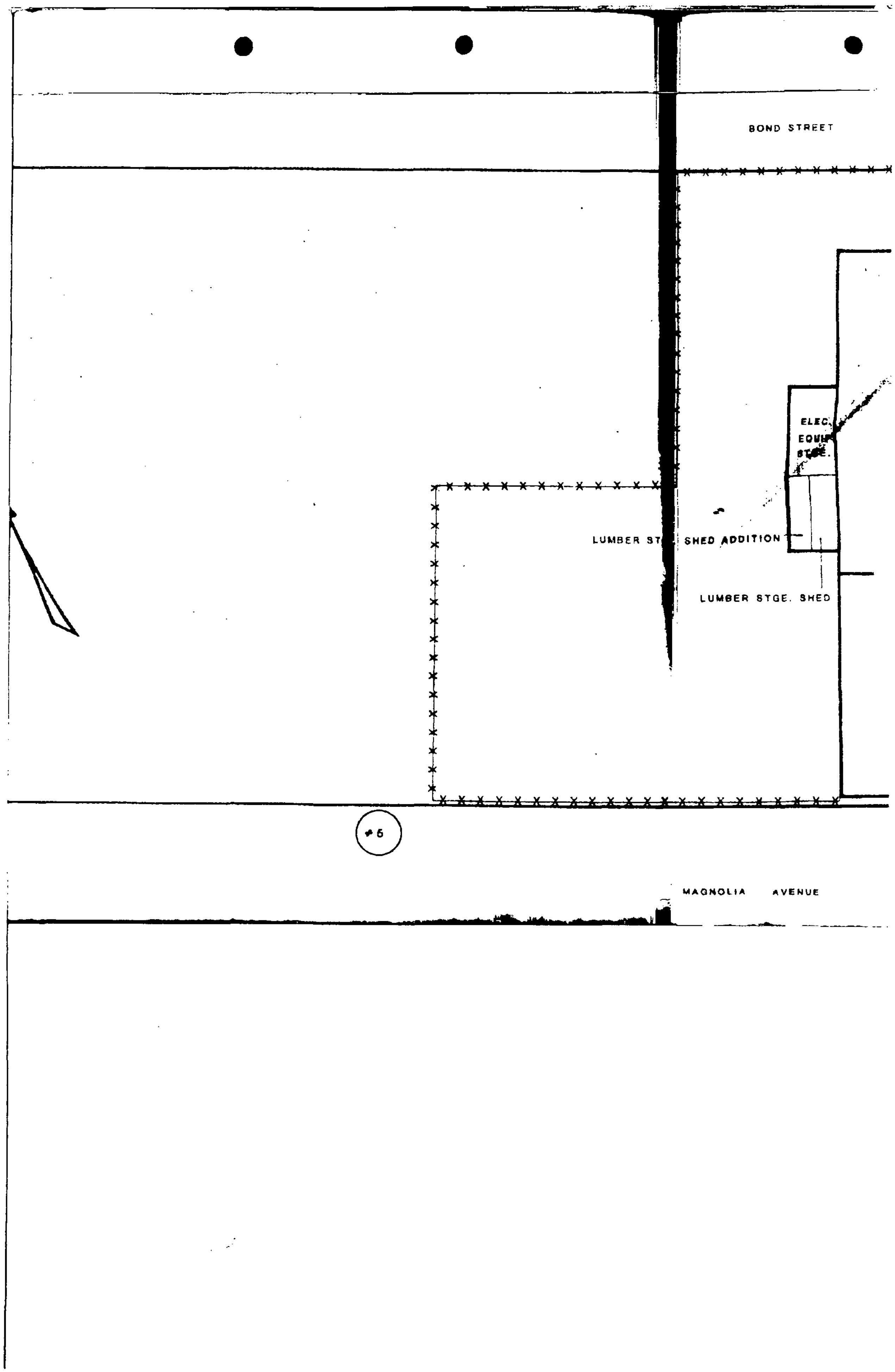


BOND STREET
ELEC. EQUIP. STGE.
LUMBER STGE. SHED ADDITION
LUMBER STGE. SHED
#6
MAGNOLIA AVENUE

959270070

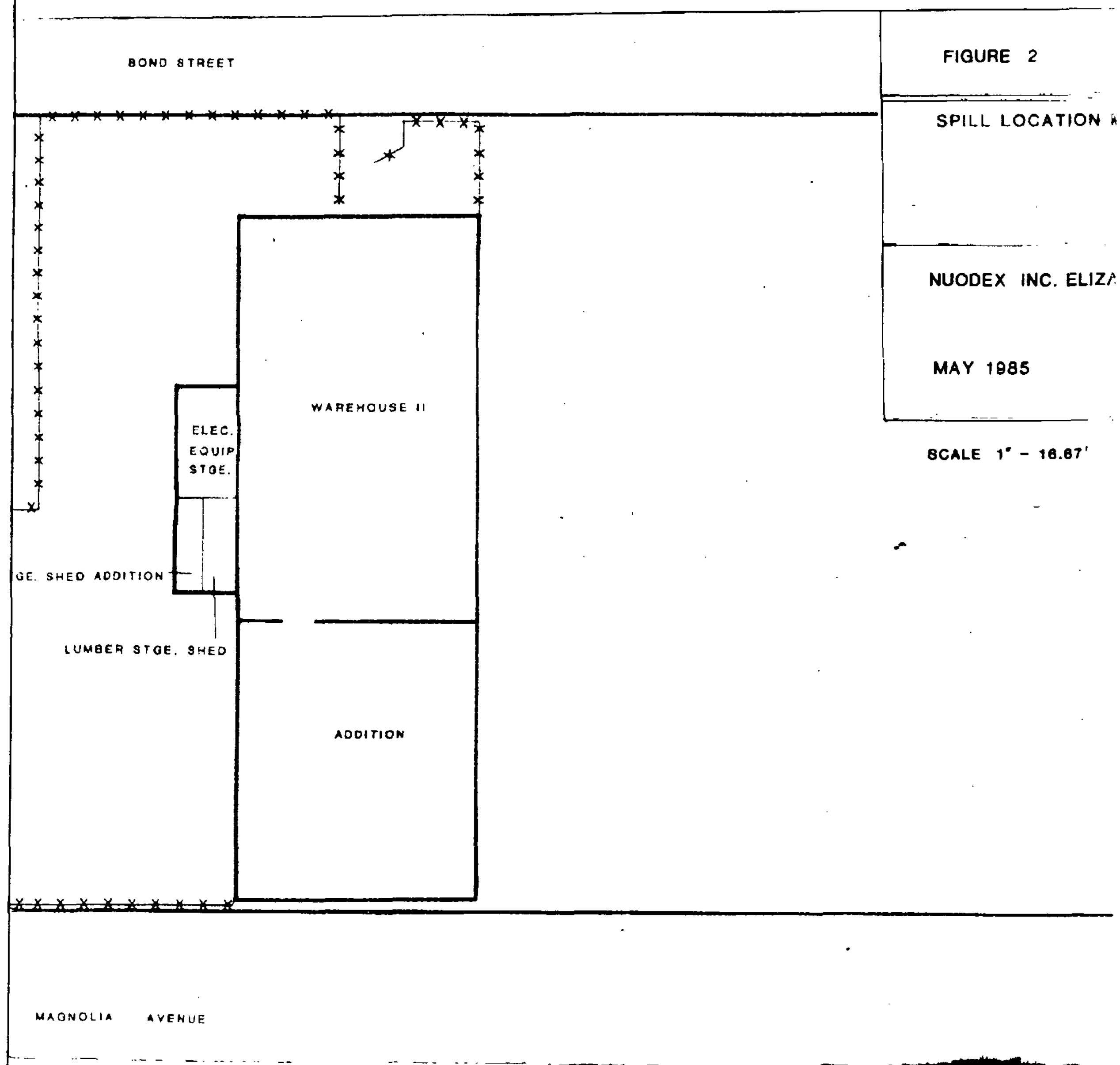


FIGURE 2

SPILL LOCATION

NUODEX INC. ELIZA

MAY 1985

SCALE 1" - 16.67'

FIGURE 2

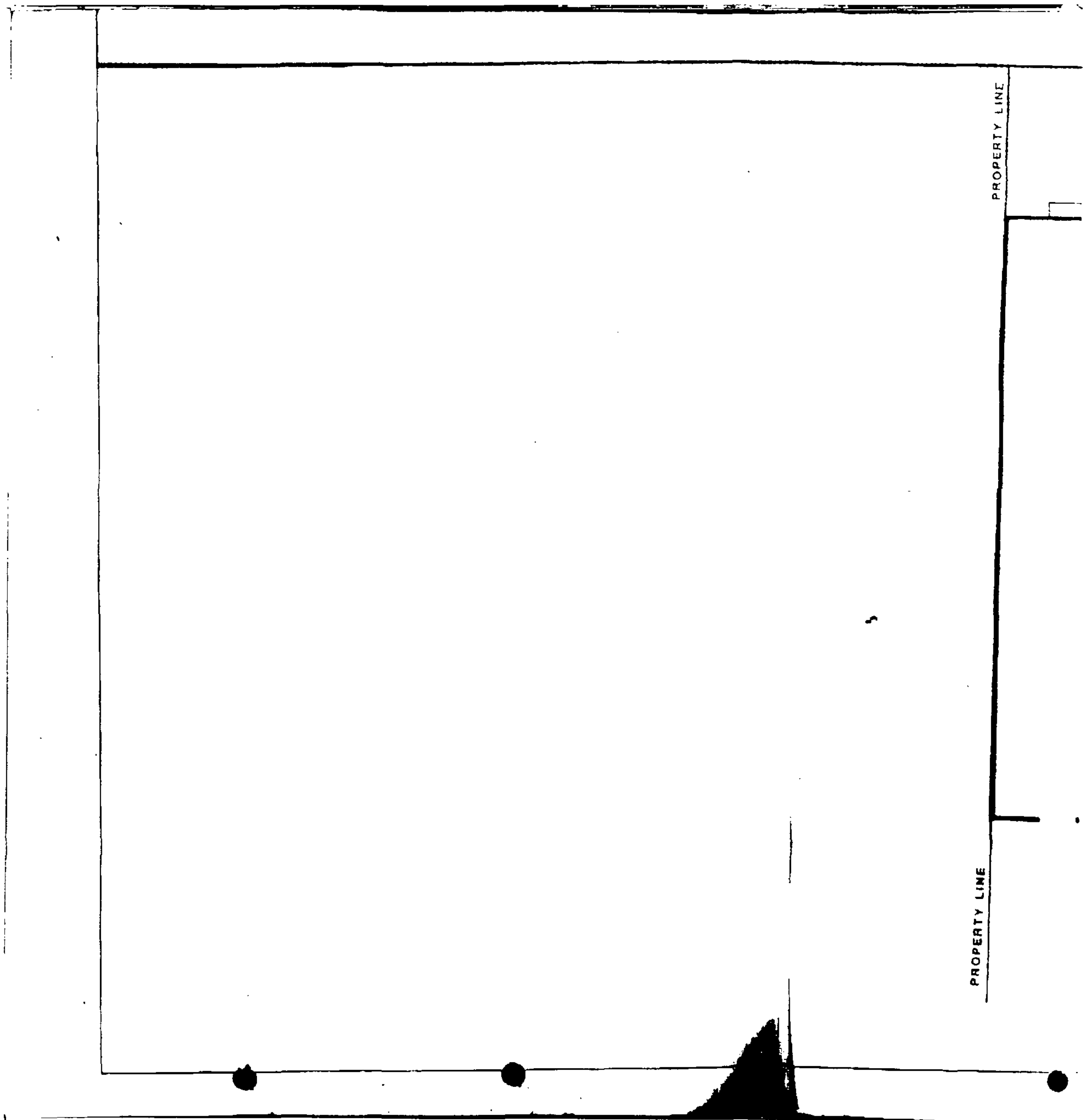
SPILL LOCATION MAP

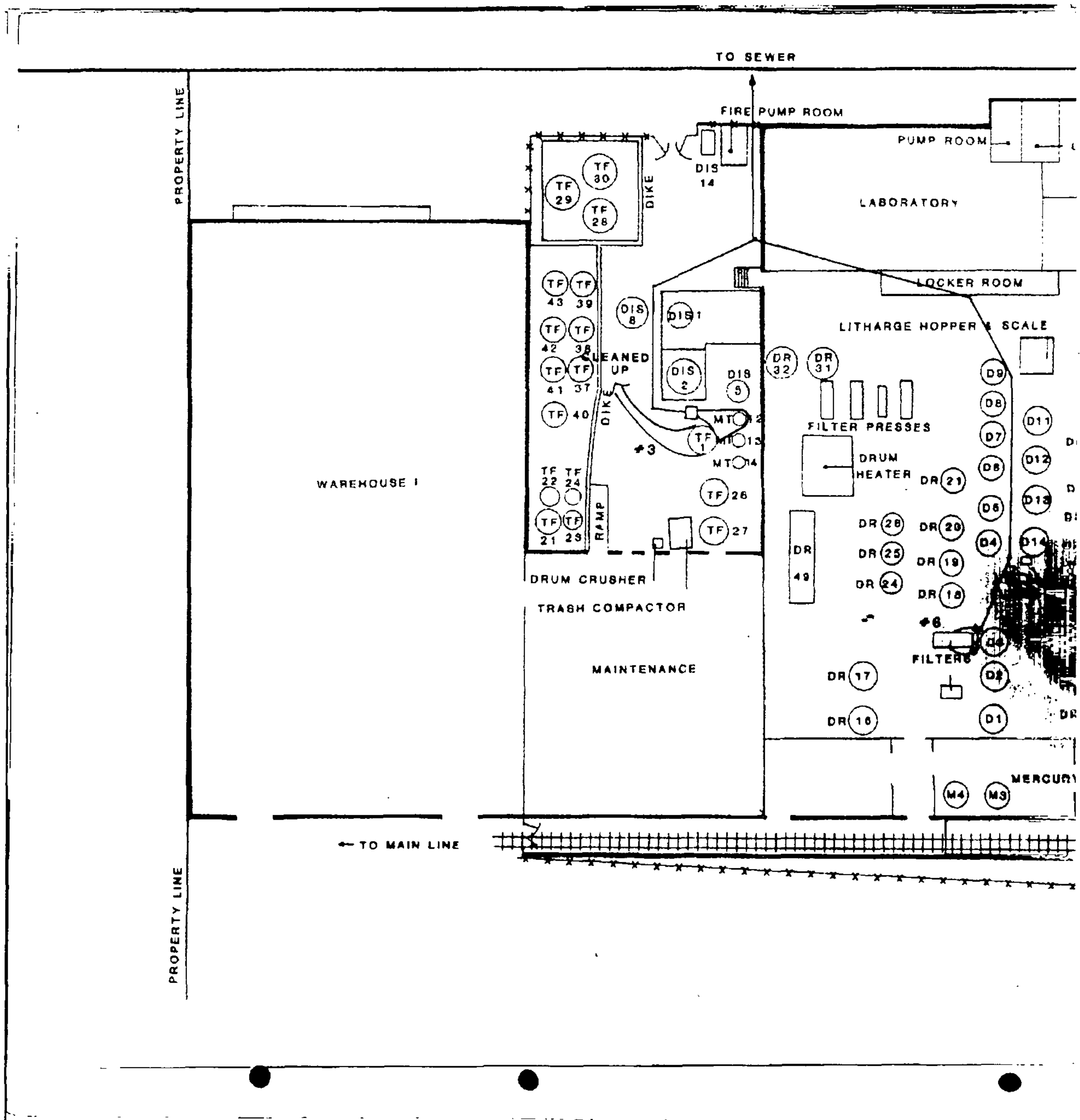
NUODEX INC. ELIZABETH, NEW JERSEY

MAY 1985

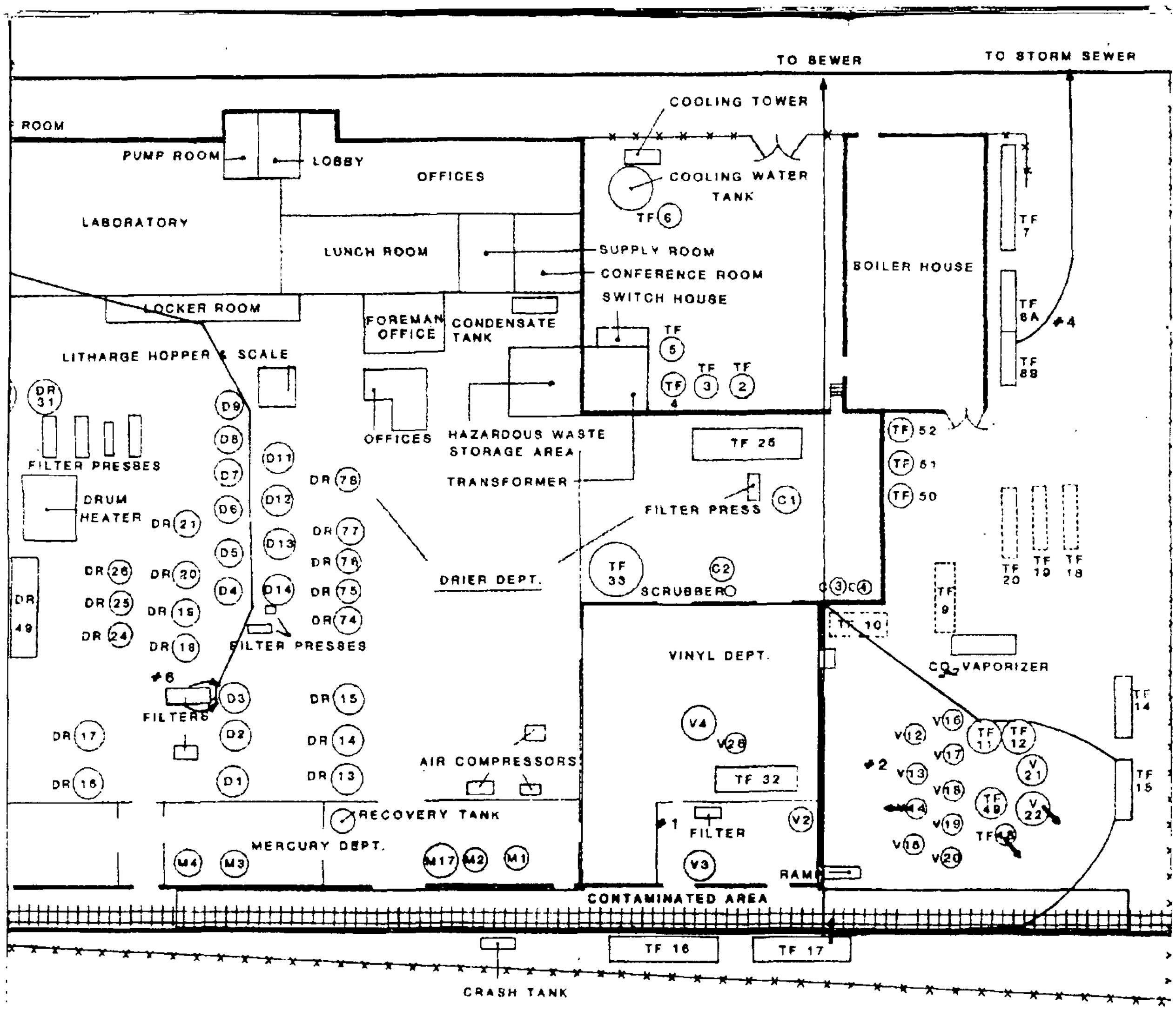
PAE

SCALE 1" - 16.67'   LEGEND: TANKS NOT TO SCALE

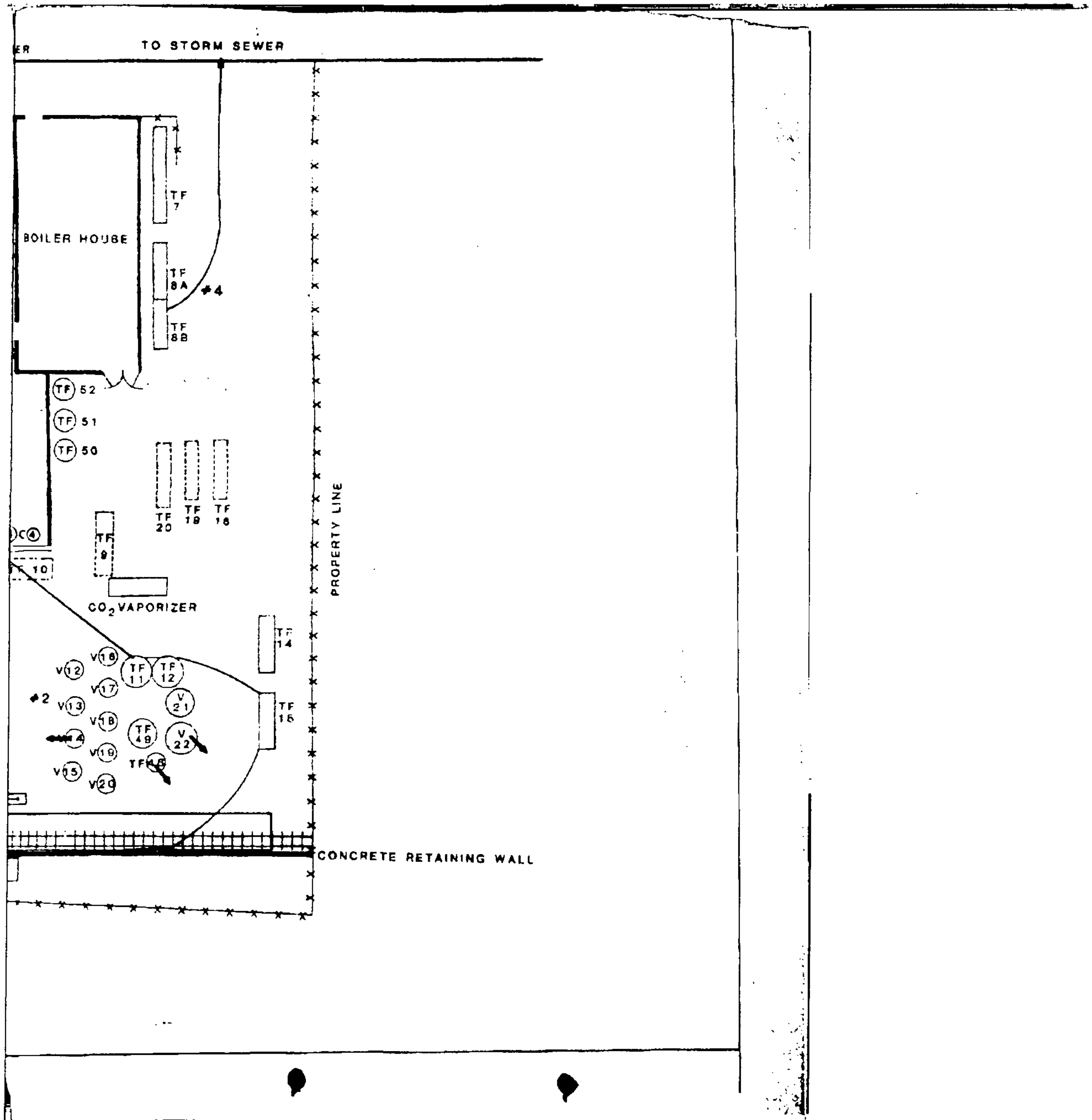

PROPERTY LINE
PROPERTY LINE



TO SEWER
PROPERTY LINE
FIRE PUMP ROOM
PUMP ROOM
LABORATORY
LOCKER ROOM
LITHARGE HOPPER & SCALE
DIS 14
TF 30
TF 29
TF 28
DIKE
TF 43
TF 39
TF 42
TF 38
TF 41
TF 37
TF 40
DIS 8
DIS 1
DIS 2
DIS 5
CLEANED UP
DR 32
DR 31
FILTER PRESSES
MT 12
MT 13
MT 14
TF 1
#3
DRUM HEATER
WAREHOUSE I
TF 22
TF 24
TF 21
TF 23
RAMP
TF 26
TF 27
DR 49
DR 21
DR 28
DR 20
DR 25
DR 19
DR 24
DR 18
DRUM CRUSHER
TRASH COMPACTOR
MAINTENANCE
#6
FILTERS
DR 17
DR 16
D9
D8
D7
D6
D5
D4
D3
D2
D1
D11
D12
D13
D14
MERCURY
M4
M3
TO MAIN LINE
PROPERTY LINE


TO SEWER
TO STORM SEWER
ROOM
PUMP ROOM
LOBBY
OFFICES
COOLING TOWER
COOLING WATER TANK
TF 6
TF 7
LABORATORY
LUNCH ROOM
SUPPLY ROOM
CONFERENCE ROOM
SWITCH HOUSE
BOILER HOUSE
LOCKER ROOM
FOREMAN OFFICE
CONDENSATE TANK
TF 8A
TF 8B
#4
LITHARGE HOPPER & SCALE
TF 5
TF 3
TF 2
TF 4
DR 31
D9
D8
D7
D6
D5
D4
OFFICES
HAZARDOUS WASTE STORAGE AREA
TRANSFORMER
TF 25
TF 52
TF 51
TF 50
FILTER PRESSES
D11
D12
D13
D14
DR 78
DRUM HEATER
DR 21
FILTER PRESS
C1
DR 77
DR 76
DR 75
DR 74
TF 33
C2
SCRUBBER
C3
C4
TF 20
TF 19
TF 18
DR 26
DR 25
DR 24
DR 20
DR 19
DR 18
DR 49
DRIER DEPT.
TF 9
TF 10
FILTER PRESSES
CO2 VAPORIZER
#6
FILTERS
D3
D2
D1
DR 15
DR 14
DR 13
VINYL DEPT.
V4
V26
TF 14
DR 17
DR 16
AIR COMPRESSORS
TF 32
V16
V12
V17
V13
V18
V14
V19
V15
V20
TF 11
TF 12
V 21
TF 49
V 22
TF 48
TF 15
#2
RECOVERY TANK
#1
FILTER
V2
V3
MERCURY DEPT.
M4
M3
M17
M2
M1
RAMP
CONTAMINATED AREA
TF 16
TF 17
CRASH TANK

959270075


TO STORM SEWER
BOILER HOUSE
TF 7
TF 8A
TF 8B
#4
TF 52
TF 51
TF 50
TF 20
TF 19
TF 18
TF 9
CO2 VAPORIZER
PROPERTY LINE
TF 14
TF 11
TF 12
TF 15
V 21
V 22
TF 49
V16
V17
V18
V19
V20
V12
V13
V15
#2
CONCRETE RETAINING WALL

Company Tenneco Chemical

Address P. O. Box 365

City Piscataway State NJ Zip 08854

To Attn. of: Mr. Martin Buys

Job #: 5253d

Date: 9/11/81

Auth.: PO 91948

Lot #: 548

Invoice #:

Sample Date: 8/21/81

REPORT OF ANALYSIS

μg/g (wet weight)

Sample #	Mercury	Barium	Cadmium	Lead
6A	540	47	39	10
6B	2000	103	76	18
6C	20	79	80	0.60
7A	1250	1.0	1.4	0.10
7B	<0.10	48	15	0.30
7C	20	30	15	0.20
8A	943	47	165	3.9
8B	509	54	181	6.4
8C	240	57	45	0.7
9A	300	20	47	1.0
9B	509	64	78	1.6
9C	140	130	11	<0.2

Company Tenneco Chemical

Address P. O. Box 365

City Piscataway State NJ Zip 08854

To Attn. of: Mr. Martin Buys

Job #: 5253d
Date: 9/11/81
Auth.: PO 91948
Lot #: 548
Invoice #:
Sample Date: 8/24/81

REPORT OF ANALYSIS

μg/g (wet weight)

Sample #	Mercury	Barium	Cadmium	Lead
10A	909	28	105	3.5
10B	250	56	15	0.40
10C	245	50	6.4	<0.10
11 Surface-1 ft	3,600	4,000	1,570	768
11 - 3 ft	700	44	62	25
12	72,000	11,500	552	3,160
13	73,100	2,290	3,060	50,500
14	132,000	3,300	374	7,700
15	16,000	330	662	72
16	21,100	169	710	153
17	144,000	112	1,010	436

Company	Tenneco Chemical
Address	P. O. Box 365
City	Piscataway State NJ Zip 08854
To Attn. of:	Mr. Martin Buys

Job #:	5253d
Date:	9/11/81
Auth.:	91948
Lot #:	548
Invoice #:	
Sample Date:	8/21/81

REPORT OF ANALYSIS

	Soil Composite No. 11, 12, 13, 14 EP Leachate (mg/l)	Soil Composite No. 15, 16, 17 EP Leachate (mg/l)
Arsenic	0.023	0.005
Barium	22.1	3.75
Cadmium	62.7	1.13
Chromium	0.005	0.023
Lead	0.030	0.085
Mercury	0.015	0.030
Selenium	<0.0002	<0.0002
Silver	0.007	0.012

ANALYSIS OF SOIL SAMPLES
COLLECTED SEPTEMBER 30, 1981

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

Company Tenneco Chemicals
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. John Saraka

Job #: 5253e
Date: 7/21/81
Auth.:
Lot #:
Invoice #:
Sample Date: 9/30/81

REPORT OF ANALYSIS

μg/g (wet weight)

	Mercury	Lead	Barium	Cadmium
S (1-3)-1	514	787	1,680	429
S (4-6)-1	1,720	668	308	36.9
S (7-9)-1	5,920	529	7,720	5,780
S (10-12)-1	6,640	612	22,500	11,400
S (13-15)-1	2,030	846	7,830	9,860
S (16-19)-1	933	783	4,340	1,030
S (1-3)-1 1 ft	2,210	560	100	16.8
S (4-6)-1 1 ft	17,400	1,080	1,680	107
S (7-9)-1 1 ft	5,580	312	4,780	778
S (10-11)-1 ft	1,670	400	4,590	7,150
S (1-3)-2	2,570	1,160	235	36.7
S (4-6)-2	5,100	820	1,220	427
S (7-9)-2	4,110	2,260	3,260	751
S (10-12)-2	2,570	1,070	7,790	1,060
S (13-15-2	1,250	3,610	3,530	1,750
S (16-19)-2	353	696	1,300	1,130
S (1-3)-3	804	647	32.6	16.5
S (4-6)-3	383	480	335	92.9
S (7-9)-3	16,100	3,300	349	132
S (10-12)-3	212	177	720	586
S (13-15)-3	540	448	1,010	1,050
S (16-19)-3	19.1	432	1,090	594

ANALYSIS

GEOHYDROLOGIC REPORT

On August 21, 1981 five test borings were made behind Tenneco's building in Elizabeth. The borings were done to a depth of 15 feet with split spoon sampling every 5 feet. Fill material was encountered in the upper 2 feet in all 5 borings. This fill consisted of crushed stone, cinders, sand silt, and clay. Clay with some fine gravel was below the fill material. Usually there was several feet of soft gray or red clay and then stiff red clay underneath (Table 1).

Based on a visual inspection of the soil, it was estimated that the permeability rate would be extremely slow. Laboratory testing confirmed the slow permeability rate (Table 2). It is our geohydrologist's opinion that the soil underlying Tenneco's Elizabeth plant is relatively impermeable and should impede any downward migration of contaminants.

TABLE 1

SOIL CHARACTERIZATION

Borings were made to a depth of 15 feet with 18 inch split spoon sampling every 5 feet. For all samples, spoons were pushed. Groundwater was not encountered in any of the holes. Upper 2 feet of fill was saturated.

BORING F6

0-2'	Fill
2-7'	Yellow clayey silt, some pea and pebble gravel (dry)
7-16.5'	Stiff red clay, some pea and pebble gravel (dry)

BORING F7

0-2'	Fill
2-9'	Soft red clay, some pea gravel (dry)
9-13'	Slightly stiff red clay, some pea gravel (dry)
13-16.5'	Stiff red clay, some pea and pebble gravel (dry)

BORING F8

0-2'	Fill
2-7'	Soft gray clay
7-16.5'	Stiff red clay, some pea and pebble gravel (dry)

BORING F9

0-2'	Fill
2-7'	Soft gray clay (dry)
7-16.5'	Stiff red clay, some pea and pebble gravel (dry)

BORING F10

0-2'	Fill
2-13'	Stiff red clay, some pea and pebble gravel (dry)
13-16.5'	Red clayey silt (dry)

TABLE 2

PERMEABILITY TEST

The permeability of the soil was determined using a falling-head permeameter designed for cohesive sediments with low hydraulic conductivities. The permeability of the soil under the Tenneco Elizabeth site ranges from 1×10^{-7} cm/sec to 1×10^{-8} cm/sec. While the test procedures result in exact figures, a permeability range is listed since laboratory procedures can only approximate actual field conditions.

METALS ANALYSIS

The following analytical procedures were used as quality assurance for the determination of metals in Tenneco Elizabeth soil samples.

- All samples were digested and analyzed in such a way to minimize cross contamination between samples.

- Ten percent of the samples were analyzed in replicate.

- Twenty percent of the samples were analyzed by a different technician on a different instrument to confirm initial analysis.

- Background corrected absorption was used, when possible, to quantify metal concentrations to limit test interferences.

- All standards were prepared on the day of analysis.

- Sample absorbances were quantified only if they were in the linear section of the standard curve.

- Blank and spiked samples were analyzed every fifteen samples.

QUALITY ASSURANCE - METALS ANALYSIS

Blank Results

Sampling (ug/g)	5/8/81	6/30/81	8/21/81
Cd	<0.001	<0.001	<0.001
Ba	<0.001	<0.001	<0.001
Zn	<0.001	<0.001	-
Hg	<0.001	<0.001	<0.001
Pb	-	-	<0.001

Replicate Results

(% Deviation)	5/8/81	6/30/81	8/21/81
Cd	5.4	2.0	2.8
Ba	8.2	-1.3	-3.4
Zn	-3.0	2.2	-
Hg	-9.0	-1.2	1.2
Pb	-	-	0.6

ORGANIC ANALYSIS

The following analytical procedures were used as quality assurance measures in the organic analysis of phenyl acetic acid and dodecyl succinic acid.

- Analytical standards were generated from the process material and compared to reagant grade standards.

- Quantification was based on the linear working range of the standards.

- Non detectable levels of phenyl acetic acid and dodecyl succinic acid were determined for a blank analyzed by the same procedure as the samples.

METAL ANALYSIS

Soil samples were prepared for analysis using the following procedures:

1) Sample composites were made when necessary by taking a representative portion of the sample and combining on an equal weight basis.

2) Five to ten grams of soil were weighed out into a flask and water cooled reflux condenser attached. Fifty milliliters of 25% nitric acid - 10% hydrogen peroxide in distilled water was then added to the samples and they were heated to digest organic material present.

3) After the samples were digested, they were filtered and analyzed for the presence of metals using flame and/or flameless atomic absorption techniques.

4) All glassware was cleaned using a double rinse of concentrated nitric acid-hydrochloric acid mixture followed by rinses of deionized water.

EP TOXICITY LEACHATE PROCEDURE

The following procedure was used for soils analyzed for EP toxicity parameters. This procedure is in accordance with "Test Methods for Evaluating Solid Waste" (EPA, 1980).

1) One hundred gram samples are placed in a continuously mixed extractor with 16 times its weight of deionized water.

2) The pH of the solution in the extractor is continuously adjusted to 5.0 with 0.5N acetic acid through the extraction procedure. If the pH of the solution is below 5.0, no acetic acid is added.

3) At the end of the extraction procedure dionized water is added to the extractor in an amount to bring the liquid extract to twenty times the weight of the solid sample.

4) The solid is separated from the liquid using a filter media with 0.45 µm pore size.

5) The liquid phase is then analyzed for the presence of metals using flame and/or flameless graphite furnace techniques.

ORGANIC ANALYSIS PROCEDURE--DEGRADATION PRODUCTS OF MERCURY (II) PHENYL ACETATE AND MERCURY (II) DODECYLSUCCINATE

The soil samples in question were suspected of contamination from Mercury (II) phenyl acetate and Mercury (II) dodecyl succinate. The primary break-down products of these compounds (i.e. dodecyl succinic acid and phenyl acetic acid) are extractable from the soils under acidic conditions into a polar solvent (in this case chloroform). The solvent was then concentrated and the acid compounds in the solvent converted to their methyl esters using a metholating reagent.

Analysis of the methyl esters was conducted using a Varian 3700 gas chromatograph equipped with a flame ionization detector which is sensitive to hydrocarbon compounds.

PERMEABILITY TESTING

The permeability of the soil was determined using a falling-head permeameter. The soil sample is contained within a cylinder with a porous stone plate above and below the soil. Water is added to the tube on the left (see attached figure) and flows upward through the cylindrical sample and is collected as overflow. The initial water level above the outlet in the falling-head tube was noted. After some time period (usually 8-15 hrs.), the water level was again measured. The permeability is then calculated from observed data. This procedure is in accordance with accepted soil science procedures (Todd, Groundwater Hydrology, 1980).

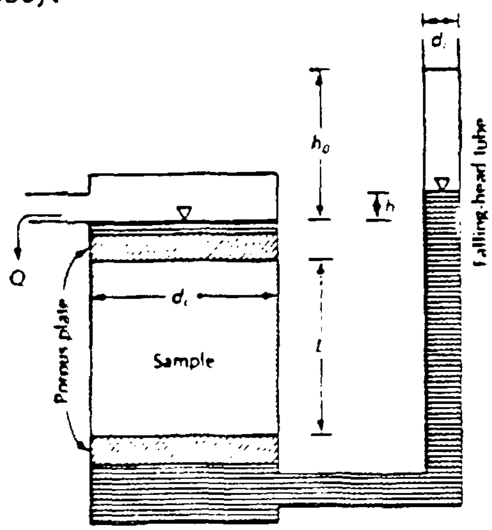


FIGURE 5.6. Falling-head permeameter apparatus

References:

Fetter, C.W., Jr., 1980, Applied Hydrogeology, Charles E. Merrill Publishing Co., Columbus.

Todd, David Keith, 1980, Groundwater Hydrology, Second Edition, John Wiley and Sons, New York.

APPENDIX VIII

SAMPLING AND ANALYSIS PLAN

Nuodex Inc.

Elizabeth, New Jersey Facility

ECRA COMPLIANCE REPORT

Table of Contents

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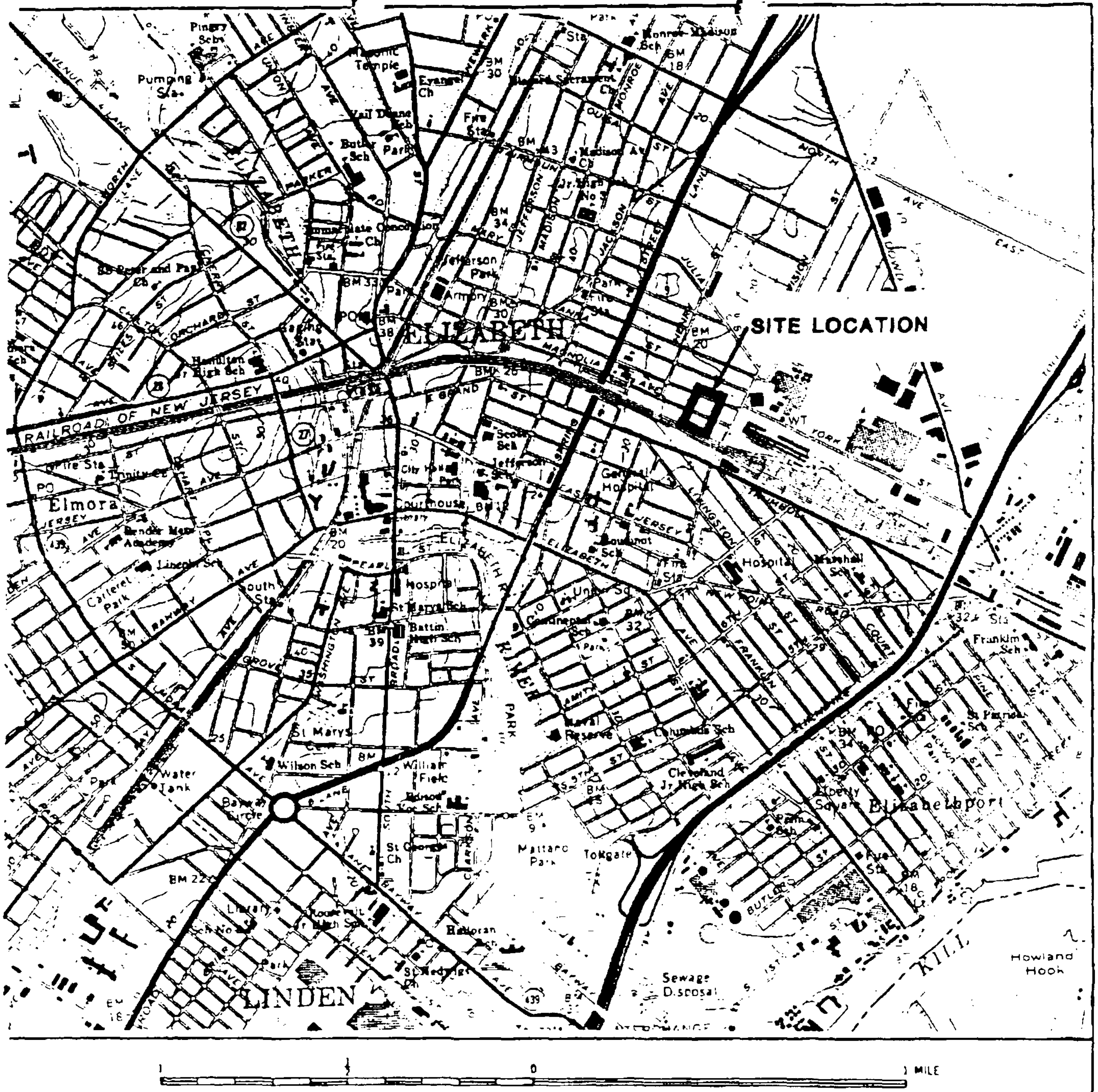
INTRODUCTION

This Sampling and Analysis Plan has been prepared for the Nuodex Inc. facility located at 830 Magnolia Avenue, Elizabeth, New Jersey (see Figure 1). The design of this plan utilizes information supplied by Nuodex Inc. and a significant body of data compiled in previous sampling performed by Princeton Aqua Science (PAS). This information is intended to supplement sampling and analysis proposed under the Plan, demonstrate areas of potential concern and indicate appropriate parameters for analysis.

The Plan has been developed in accordance with the requirements of N.J.A.C. 7:1-3.7(d)14 under the Environmental Cleanup Responsibility Act (ECRA).



SOURCE:

U.S.G.S 7.5 MINUTE SERIES,
ELIZABETH QUADRANGLE

FIGURE

SITE LOCATION MAP

NUODEX INC.
ELIZABETH, N.J.

ENVIRONMENTAL SETTING

The Nuodex Inc. facility in Elizabeth, New Jersey is located in an industrial/commercial area adjacent to U. S. Highway #1. Surficial soils consist of sand, silt, and gravel fill ranging in thickness from six (6) inches to approximately 10 feet in some areas, based upon borings conducted at the site from 1981-1982. The fill material is underlain by glacial ground moraine composed of red clay to sandy clay with some gravel. The depth to red shale/sandstone bedrock is between 30 and 50 feet. Permeability testing was conducted on shelly tube samples of the fill material and clay. The fill has a permeability ranging between 3.3×10^{-4} cm/sec and 8.5×10^{-5} cm/sec. The clay ranges from 5.1×10^{-7} cm/sec to 4.6×10^{-8} cm/sec.

Groundwater was not encountered to a depth of 16.5 feet. However, perched water was detected in the fill material underlying the railroad tracks in the rear of the property. Local topography and relative location of surface waters suggest that groundwater flows in an easterly direction towards Newark Bay.

References:

(1) PAS reports dated between 1981 and 1982 on the Tenneco Elizabeth facility.

(2) Engineering Soil Survey of New Jersey, Report No. 5, Union County, Rutgers University, September, 1952.

(3) U.S.G.S. 7.5 Minute Topographic Series, Elizabeth Quadrangle, 1967.

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

Three (3) areas of this Nuodex facility have been designated as areas of potential environmental concern. In addition one (1) site has been selected to provide data on background contaminants present in this urban, industrial area.

The majority of this property is covered by concrete, macadam or buildings. This has effectively isolated the soils in these areas from any contaminants generated by Nuodex. Open soil potentially receiving hazardous wastes/materials exist at the rail spur along the southern border of the property, in the open crawl space below the vinyl department and at portions of the drum storage adjacent to Warehouse II. The parking lot on the north side of Magnolia Avenue is not paved. However, the use of this areas has been restricted to parking of employee vehicles only. This is not anticipated to be an area of environmental concern.

Princeton Aqua Science (PAS) previously conducted extensive sampling and analysis at the rail spur and vinyl department crawl space areas. The scope and results of this program are discussed in detail in "Sample Locations" and the "Summary of Analytical Investigations from 5/8/81 to 5/5/82 Tenneco Chemicals, Inc., Elizabeth, New Jersey Facility". For purposes of the following discussions this sampling and analysis has been used to define areas of concern and general contaminants.

Area A - Rail Spur

The rail spur at the rear of the property borders both a tank farm and several production areas. Due to changes in production methods, materials and mode of delivery, this spur is infrequently used at present. However, in the past this area was used for receiving and transferring bulk production materials.

Two possible sources of contaminants exist in this area - incidental spillage and washdown of production area floors. No reportable spills of hazardous materials/wastes occurred in this area. However, due to the nature of bulk receiving/transfer operations, past incidental spillage remains a potential source of soil contaminants.

Prior to installation of a collection system, wash water generated during cleanup of the floors in the mercury department was routinely diverted to the fill on the rail spur. This wash water was contaminated with barium, cadmium, lead, mercury and smaller quantities of organics.

The collection system currently in place consists of a metal gutter designed to receive all wash water at the point it leaves the building. The water flows by gravity to the sump adjacent to the vinyl department and is recylced to the onsite mercury treatment system. This system in combination with reduced rail usage has virtually eliminated any further potential for contamination of this area.

Area B - Vinyl Department

An open crawl space exists below the vinyl department production floor. This area was reported to have been contaminated through leakage of underground pipes leading from the floor drains. The wash water from cleanup of floors in the vinyl department entered these floor drains and ultimately the clay pipe network below the crawl space. At some indeterminate time this pipe system developed leaks allowing wash water to leach into the soil. Principal contaminants have been identified as cadmium, barium, lead, mercury, organic solvents and petroleum hydrocarbons.

Area C - Background

Selection of a background sampling site within the manufacturing or warehousing areas is not feasible. The intensity of industrial use in these areas renders any open area subject to contamination.

Therefore, background sampling will be conducted at the parking lot located on the north side of Magnolia Avenue.

SAMPLE LOCATIONS

A significant volume of soil sample data has been generated for the area of the railroad siding and the vinyl department crawl space. This information has indicated the presence of mercury, barium, cadmium, lead and organic contaminants in the soil. Therefore, the initial phase of sampling intended to define the existance and type of contamination has been accomplished. Further sampling to these ends will be limited under this plan. Instead, the emphasis in these locations will be to define horizontal and vertical extent of the contaminants.

The results of soil sampling and analysis completed to date is summarized in Attachment A of this Sampling and Analysis Plan and Map #3.

Remedial action was undertaken by Tenneco Chemicals to address the most heavily contaminated soils at the facility. This included the excavation of trench (200 foot long x 30 inches wide x 18 inches deep) adjacent to the mercury and vinyl departments and parallel to the rail siding.

The removal of oil sludge, soil and gravel at the rail siding was conducted concurrent with the trench excavation. All wastes generated in this cleanup were disposed of in an approved, secure landfill.

Contaminated perched groundwater noted in completing soil borings at the rail siding is collected through a leachate recovery system. This system consists of perforated pipe buried parallel to the tracks and discharging into a sump at the south eastern corner of the property. Contaminated leachate is treated onsite to remove metal contaminants prior to discharge to the joint meeting.

Results of all analysis conducted on soils and leachate from these areas are contained in Appendix X and/or VII.

The following is a discussion of further sampling proposed for the rail siding and vinyl department crawl space. Sampling at the flammable waste storage area and parking lot is intended to determine whether contaminants are present and to develop a data base for background contaminant levels.

Area A - Rail Siding

Soil borings will be completed to a depth of 15 feet at 10 locations. The specific locations of the borings has been weighted towards areas previously demonstrated to have the highest contamination. Five (5) borings have been designated for completion outside the rail access doors where contaminated floor wash water was discharged.

Samples will be collected by split spoon auger in two (2) foot increments continuously through the boring. Samples will be selected from the top six (6) inch increment of each two (2) foot auger (0-6", 24-30", 48-54", etc.) for collection. Should complete spoon recovery not be possible the approximate depth and volume of recovery will be noted. Sample collection will begin immediately below any gravel layer present at the siding.

Samples collected from four (4) depths at each boring will be analyzed. The sample depths will be 0-6", 48-54", 96-102" and 168-174". Analysis will be performed on all samples for mercury, lead and cadmium. These parameters have been demonstrated to exist at the greatest levels and will serve as indicator parameters.

To further describe the types of contaminants present in this area three (3) samples will be selected for U.S.E.P.A. Priority Pollutant Plus 40 analysis. The samples will be collected at three (3) borings. The 0-6" sample at borings A-1, A-6 and A-10 will be analyzed for all parameters except the volatile organic fractions. The 24-30" increments at each of these borings will be analyzed for the volatile organic fraction.

Area B - Vinyl Department Crawl Space

Access to soil below the vinyl department is severly restricted by the height of the crawl space (18" and less) and the exposure risk to sample technicians posed by the soil contaminants. Therefore, sample collection will be executed through borings completed at the perimeter of the building and through the production room floor.

Soil borings A-5 and A-6 will be completed in the rail siding adjacent to the vinyl department. Analysis of these samples will be used to supplement site specific soil samples.

At four (4) locations within the vinyl department borings will be completed through the floor. Where possible this will be accomplished using available access ways. The borings will be executed with the use of a portable drill rig suitable for application in aras of limited overhead space and surface area.

The borings will be completed to a depth of 15 feet below the soil surface. Sample collection will be from six (6) inch increments on two (2) foot intervals. As previously described for Area A these samples will be collected at 0-6", 24-30", 48-54", etc., where sample recovery permits.

A composite of a portion of the 0-6" and 24-30" increments will be composited for analysis for U.S.E.P.A. Priority Pollutants Plus 40. The 0-6" increment will be analyzed for all parameters with the exception of volatile organics. The 18-24" increment will receive volatile organic analysis. Compositing will be performed in the laboratory on an equal weight basis.

The samples collected from 0-6", 48-54", 96-102" and 168-174" at each boring will be individually analyzed for cadmium, mercury and lead.

All borings completed in the rail siding and vinyl department areas will be backfilled with bentonite or cement. This will aid in maintaining the integrity of the clay layer known to exist below these locations.

Area C - Background

One (1) boring will be completed to a depth of 15 feet in the parking lot. Sample collection depth and analytical parameters have been selected to parallel other sample locations. Soils will be collected from the top six (6) inch increment of each two (2) foot split spoon auger sample. Assuming full recovery of each split spoon the increments will be collected at 0-6", 24-30", 48-54", etc.

Analysis for U.S.E.P.A. Priority Pollutants Plus 40 less the volatile fraction will be completed on the 0-6" increment. Volatile analysis will be executed on the 24-30" increment. Samples collected at 48-54", 96-102" and 168-174" will be analyzed for cadmium, lead and mercury.

A summary of sampling locations, depths and analytical parameters is contained in Table 1.

Table 1

Nuodex Inc.
Elizabeth, New Jersey

SAMPLING SUMMARY

Location	Depth of Auger Hole	Sampling Increments	Sampling Parameters
A-1, A-6, A-10	15'	0-6"	P.P. + 40 less volatile fraction
		24-30"	Volatile Organics
A-1 through A-10	15'	0-6", 48-54", 96-102", 168-174"	Cd, Hg, Pb
B-1 through B-4	15'	0-6" comp.	P.P. + 40 less volatile fraction
		24-30" comp.	Volatile Organics
		48-54", 96-102", 168-174"	Cd, Hg, Pb
C-1	15'	0-6"	P.P. + 40 less volatile fraction
		24-30"	Volatile Organics
		48-54", 96-102", 168-174"	Cd, Hg, Pb

SAMPLING METHOD AND ANALYSIS

All soil samples will be collected by hand auger or a small trailer mounted drilling rig. Six (6) inch cores and split spoon samples will be removed from the auger by turning the auger on its side and pushing the soil out with a sterilized tongue depressor. The soil will be placed on a two (2) foot square, teflon-coated benchkote pad, which will be disposed of after each use. Each core will be quartered with opposite quarters being placed into two (2) separate bottles. The bottles will be pint sized, glass containers with aluminum caps and teflon liners.

The auger will be decontaminated between samples by first brushing off any excess soil followed by an alconex or trisodium phosphate detergent wash and deionized water rinse. Following this cleanup, the auger will be wiped first with acetone and finally with hexane.

A field and travel blank will also be submitted along with the soil samples as part of Quality Assurance. The travel blank will consist of a set of sample containers filled with laboratory demonstrated analyte in the manner as the soil samples acquired that day. The field blank consists of two (2) sets of laboratory cleaned sample containers. One (1) set of containers is empty and will serve as the sample containers that will be analyzed.

The second set of containers will be filled at the laboratory with laboratory demonstrated analyte free water. At the field location, this analyte free water will be passed through clean sample equipment and placed in the empty set of sample containers for analysis.

All samples will be collected by PAS personnel. Technicians will be equipped with appropriate protective gear. N.J.D.E.P. will be notified prior to execution of sampling, and duplicate samples will be retained by PAS.

Sample bottles will be sealed and labeled on site. Detailed information on Princeton Aqua Science's Quality Control and Assurance Procedures are on file with the State of New Jersey. The Plan includes appropriate container type and preservative by analytical parameter along with reference test methods and copies of chain of custody forms.

Samples collected as part of this Plan will be analyzed by the methods in Table 2.

Table 2

Nuodex Inc.
Elizabeth, New Jersey

LABORATORY SAMPLE ANALYSIS

Analytical Parameter(s)	Test Method(s)
U.S.E.P.A. Priority Pollutants	Organic compound scan analysis with confirmation of all detectable organic compounds by gas chromatograph mass spectrometer (GC/MS) methodologies outlined in EPA Method 624 and 625 (F.R.: V.44, No. 233 dated 12/3/79 and revised in EPA publication 600/4-82-057 dated 7/82) and "Test Methods for Evaluating Solid Waste" U.S.E.P.A. SW846 dated 7/82. Priority pollutant metals, cyanide and total phenols analysis in accordance with "Test Methods for Evaluating Solid Waste" U.S.E.P.A. SW846 dated 7/82. Identification of organic non-priority pollutant compounds ("Plus 40") will be by forward library search of the EPA/NIH/NBS mass spectral library of the compounds of the greatest apparent concentration in each respective organic fraction (15 for purgeable fraction, 15 for base/neutral fraction and 10 for acid extractable fraction). NOTE: Substances with less than 25 percent of the internal standard will not be searched.

NOTE: One (1) in every ten (10) samples analyzed in duplicate as part of Quality Assurance.

REPORT

Upon completion of sample analysis, a summary report on the execution of this plan will be prepared. The report will include an overview of the complete field work, analytical results and Quality Control Assurance information.

Nuodex Inc.
Elizabeth, New Jersey

SAFETY PLAN FOR SITE SAMPLING

General

1. This plan presents minimum personnel protection requirements for site sampling.

2. All onsite personnel, workers or observers, are required to follow this Plan.

3. Safety levels specified are minimums: downward modification may occur at the discretion of the onsite supervisor only after consultation with the PAS Corporate Health and Safety Officer.

4. Clothing and equipment specifications are for protection from dermal and inhilation exposure to organic vapors and dusts.

Protective Clothing and Equipment

1. Workers involved with soil sampling, as well as observers within each area of potential environmental concern, are required to utilize the following protection: 1) Tyvex/saran coveralls; 2) disposable outer boots; 3) outer nitrile rubber gloves and inner cotton gloves; 4) steel toed safety shoes; 5) safety glasses; 6) respiratory protection as discussed below.

2. Air monitoring of each area of potential environmental concern will be used to define the need for respiratory protection. Sampling points within Areas "A" and "B" will be scanned utilizing an HNu photoionization meter. If readings above 10 ppm are encountered, personnel will be required to utilize a full face cartridge respirator with organic vapor/acid gas cartridges. Initial area screening will be performed utilizing this respirator.

ATTACHMENT A

SUMMARY OF PREVIOUS

SAMPLING AND ANALYSIS

SUMMARY OF ANALYTICAL INVESTIGATIONS

FROM 5/8/81 to 8/21/81

at

TENNECO CHEMICALS INC.

ELIZABETH, NEW JERSEY FACILITY

The analysis of selected soil samples from the Elizabeth, New Jersey facility of Tenneco Chemicals Inc. was performed by PAS as part of a preliminary investigation of potential contamination of soils at the plant site on May 8, June 30, and September 30, 1981 at the direction of Tenneco Chemicals Inc. The data that follows represents a series of soil samples obtained from surface grab samples and subsurface borings at the plant site at locations indicated by a sketch of the area provided by Tenneco Chemicals Inc. (see sketch).

Analysis of samples obtained on May 8, 1981 and provided by Tenneco Chemicals Inc. for cadmium, barium, zinc, mercury, and soil COD is indicated by the PAS data sheet contained herein. Samples 1 through 9 were samples taken of wall seeps of a subsurface room in the plant. Samples A, B, C, and D were taken from soils directly beneath the vinyl room floor of the facility. The reference sample was obtained from a soil sample taken on the property away from the plant buildings.

The analysis indicated that there was severe contamination of the soils beneath the vinyl room floor for all metals tested and all samples. Percent organic matter analysis (soil COD) confirmed organo-metal contamination. Based upon these results, a second sampling of soils away from the facility buildings but on the Elizabeth facility property was conducted on June 30, 1981.

Soil borings were taken and split spoon soil samples obtained at five locations along the rear property boundary of the property (see sketch sample points 1-5). Sample designations A, B, and C indicate depth of sample at 5, 10, and 15 feet, respectively. The analysis indicates some contamination of zinc, barium, and cadmium at the 5 ft. depth level. However, generally severe contamination was not apparent in these samples. Analysis for phenyl acetic acid and dodecyl succinic acid was below detectable limits.

On August 21, 1981 a series of five (5) soil borings were performed to obtain split spoon samples at 5, 10, and 15 foot depths (A, B and C) at a series of locations midway between the facility building and the back property line. In addition, seven (7) surface soil core samples were taken at the building wall. A PAS geologist was present for the soil boring operations to characterize soil types and collect samples for analysis. The analysis of soils for the metals of mercury, barium, cadmium, and lead indicated severe contamination of surface samples (11-17) near the facility building with highest concentrations located near access points (doorways) to the building. Borings numbered 6-10 at depths of 5, 10, and 15 ft. (A, B, and C, respectively) indicated contamination at 5 ft. with decreasing concentration with depth.

EP leachate testing of equal weight soil composites of samples 11-14 and 15-17 indicated leachable cadmium and barium with lead and mercury being tightly bound to the soil. Additionally, cation exchange capacity of the soils was evaluated for the 5 ft. depth of soil borings 6-10. Cation exchange capacity was deemed moderate to poor.

Geohydrologic evaluation indicated 1 to 2 ft. of fill over soft gray to stiff red clay. The permeability of the soil was measured to be 1×10^{-7} cm/sec. which is comparable to very low permeability clays used as barrier in secure landfills.

Generally, the data indicates a serious surface soil contamination at and in close proximity to the back wall of the facility building with some vertical migration. The soils are characterized to be low permeability clays under the site having the potential to hold the materials from movement off-site or migration vertically.

SUMMARY OF ANALYTICAL INVESTIGATIONS
FROM 5/8/81 TO 5/5/82
TENNECO CHEMICALS, INC.
ELIZABETH, NEW JERSEY FACILITY

Surface and subsurface soil samples were collected by Tenneco and PAS personnel several times last year during the spring and summer months as outlined in Table 1. Sampling was confined to the back of the building along the railroad tracks as far as the cement retaining wall (Figure 1). Analysis of these samples indicated severe contamination of the surface soils, which led to removal of this contaminated soil in the fall.

Further sampling conducted last month was to determine if contamination had spread to other parts of the site. A total of six soil borings were performed: one on each of the 4 corners of the property and two between the retaining wall and the fence (Figure 2). The boring depths ranged from 8 feet at borings 1, 2, and 6 to 12 feet at borings 3 and 4. The depths varied to compensate for differences in elevation. Split spoon samples 2 foot long were collected continuously down to the desired depth, except where shelby tube samples were taken for permeability testing.

Shelby tube samples of the fill and clay were collected at each boring except for #3 due to its proximity to #2. No clay sample was obtained at #5 because the clay was not encountered until the bottom of the hole. No fill or sandy soil was present at boring 6. Therefore, only a clay sample was collected. Boring 1 had some sandy soil, but not enough for testing.

A PAS geologist was present for the soil boring operations to characterize soil types and collect samples for analysis and testing. The analysis of soils for the metals of mercury, barium, cadmium, and lead indicate severe contamination of mercury at boring 2 located in the southeast corner between the railroad tracks, with significantly lower concentrations at boring 3 located within 10 feet of boring 2 along the fence line. Barium levels were high throughout the site at depths ranging from 2-10 feet. The surface soils, down to 6 feet, along the back property line are contaminated with lead. High lead concentrations were also found at boring 6 below 6 feet. Cadmium levels were within the range for natural soils, except for boring 2 which had severe mercury contamination. The soils analysis can be found in Appendix A.

EP leachate testing was conducted on three of the most contaminated soils: boring 2, a composite of the 2-4 and 4-6 foot depths; boring 4, the 2-4 foot sample; and boring 5, a composite of the 2-4 and 4-6 foot depths. The soil from boring 2 was clay, while boring 4 and 5 samples consisted of fill material. The results shown in Appendix A indicate that the metals are tightly bound to both soil types.

The geohydrologic evaluation, Appendix B, indicates a thin layer of sandy soil along the front of the building with 2-10 feet of fill in the back between the building and the fence. Underlying the entire site below the sandy soil and fill is a dense red clay with a permeability ranging from 5.1 x 10^{-7} to 4.6 x 10^{-8} cm/sec. The fill material has a permeability range of 3.3 x 10^{-4} to 8.5 x 10^{-5} cm/sec. The fill has a moderate to low permeability comparable to a sand, silt, and clay mixture, while the clay has a very low permeability indicative of a massive clay, such as the type used as barriers in secure landfills.

LIST OF ANALYTICAL FINDINGS

FROM MAY 1981 TO MAY 1982

AT

TENNECO CHEMICALS, INC.

ELIZABETH, NEW JERSEY FACILITY

YEAR 1981

Month	Day		ACCOMPLISHMENTS
May	8	Sampling of:	Wall seeps of a subsurface room in plant and soils beneath the vinyl room floor by Tenneco personnel.
		Analysis for:	Mercury, barium, cadmium, zinc, and soil COD.
		Results:	Severe organo-metallic contamination beneath vinyl room floor.
June	30	Sampling of:	Soils at 5 locations along rear property boundary from 5, 10, and 15 foot depths using split spoon sampling.
		Analysis for:	Mercury, barium, cadmium, zinc, phenyl acetic acid, and dodecyl succinic acid.
		Results:	No severe contamination; some contamination of barium, cadmium, and zinc at 5 foot; acids below detectable limits.
Aug.	21	Sampling of:	Soils at 5 locations midway between facility building and rear property line from 5, 10, and 15 foot depths using split spoon sampling, plus 7 surface soil core samples at building wall.
		Analysis for:	Mercury, barium, cadmium, lead, EP leachate, and CEC.
		Results:	Subsurface samples showed contamination at 5 foot with decreasing concentrations with depth; severe contamination of surface samples with highest concentrations near access points (doorways) to building; leachable barium and cadmium with mercury and lead tightly bound to soil; CEC is moderate to poor.

Month	Day		
Sept.	30	Sampling of:	Surface soils along back of building in 3 distinct areas by Tenneco personnel: A. Between building and railroad tracks, B. Between railroad tracks, and C. Between railroad tracks and cement retaining wall
		Analysis for:	Mercury, barium, cadmium, and lead.
		Results:	Severe contamination in areas A & B with significantly lower concentrations in Area C.
Fall			Removed 1-3 feet of contaminated soil along back of property between building and retaining wall.

YEAR 1982

Month	Day		
May	4-5	Sampling of:	Soils within 12 feet of surface at the 4 corners of the property and 2 between the retaining wall and fence using split spoon sampling; shelby tube sampling of fill and clay for permeability testing.
		Analysis for:	Mercury, barium, cadmium, lead, EP leachate, and permeability.
		Results:	Severe mercury contamination in SE corner between railroad tracks; high barium levels throughout site; lead contamination of soils along back property line; metals not leachable; fill has moderate-low permeability while clay is very low.

Tenneco Chemicals Incorporated

SOIL SAMPLING PROGRAM

May 8, 1981

Sample Number	Sample Location	Sample Depth
A	Beneath floor of vinyl department	Surface
B	Beneath floor of vinyl department	Surface
C	Beneath floor of vinyl department	Surface
D	Beneath floor of vinyl department	Surface
Reference	Onsite, away from facility	Surface

ANALYSIS OF SOIL SAMPLES
COLLECTED MAY 8, 1981

Company Tenneco Chemicals	Job #: 5253e
	Date: 6/26/81
Address 830 Magnolia Avenue	Auth.: 87968
	Lot #: 314
City Elizabeth State NJ Zip 07201	Invoice #: 5910
	Sample Date: 5/8/81
To Attn. of: Mr. John Saraka	

REPORT OF ANALYSIS

Sample No.	Cadmium (µg/g wet wt)	Barium (µg/g wet)	Zinc (µg/g wet)	Mercury (µg/g wet)	COD (as % Organic Carbon)
1	74	49	141	142	0.45
2	58	100	20	90	3.56
3	27	23	59	42	0.25
4	15	17	16	21	0.13
5	21	43	22	369	4.05
6	12	41	15	19	0.14
7	12	18	72	10	0.54
8	16	14	98	454	0.14
9	3	24	708	74	0.08
A	1,200	3,500	228	675	8.10
B	33,600	3,350	10,700	2,850	34.5
C	12,700	3,350	8,900	4,200	37.1
D	12,300	325	9,520	4,810	14.5
Reference	9	148	1,280	47	2.42
#2 Pit	29	32	70	209	-

Tenneco Chemicals Incorporated

SOIL SAMPLING PROGRAM

June 30, 1981

Sample Number	Sample Location
1-A, B, C*	South side of railroad tracks on southeast side of property, approximately 50' from east property line.
2-A, B, C	South side of ralroad tracks on southeast side of property, approximately 75' from east property line.
3-A, B, C	South side of railroad tracks on southeast side of property, approximately 100' from east property line.
4-A, B, C	South side of railroad tracks on southeast side of property, approximately 125' from east property line.
5-A, B, C	South side of railroad tracks on southeast side of property, approximately 150' from east property line.

*A = 5' depth
B = 10' depth
C = 15' depth

Analysis of Soil Samples
Collected June 30, 1981

Company Tenneco Chemicals
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. John Saraka

Job #: 5253e
Date: 7/31/81
Auth.: 89041
Lot #: 426
Invoice #: 5974
Sample Date: 6/30/81

REPORT OF ANALYSIS

	Mercury	Zinc	Barium	Cadmium	% Solid
			µg/g (wet wt)		
1A	0.281	61.9	157	1.91	86.6
1B	0.676	69.0	91.6	0.924	87.2
1C	0.152	51.3	86.0	2.24	85.1
2A	0.107	69.2	48.0	0.240	85.8
2B	0.386	81.1	95.2	0.727	86.5
2C	<0.005	2.69	77.9	1.40	88.7
3A	0.376	102	134	0.299	82.2
3B	<0.005	62.5	67.1	0.119	86.2
3C	0.643	57.6	79.7	0.139	87.1
4A	0.468	57.9	149	0.849	81.6
4B	0.901	57.5	91	1.42	87.5
4C	0.456	60.9	108	0.807	87.8
5A	2.80	45.2	32.0	4.19	76.8
5B	0.499	52.7	54.0	0.597	85.3
5C	2.39	47.3	80.0	<0.080	97.0

Company Tenneco Chemicals	Job #: 5253e
Address 830 Magnolia Avenue	Date: 7/31/81
	Auth.: 89041
City Elizabeth State NJ Zip 07201	Lot #: 426
	Invoice #: 5974
To Attn. of: Mr. John Saraka	Sample Date: 6/30/81

REPORT OF ANALYSIS

	5A	5B	5C
		µg/kg (dry wt)	
Phenyl Acetic Acid	<50	<50	<50
Dodecyl Succinic Acid	<50	<50	<50

Tenneco Chemicals Incorporated

SOIL SAMPLING PROGRAM

August 21, 1981

Sample Number	Sample Location
6-A, B, C*	Between railroad tracks on southeast side of property, outside vinyl department doorway.
7-A, B, C	Between railroad tracks on southeast side of property, due south of stairwell between mercury room #1 and vinyl department.
8-A, B, C	Between railroad tracks on southeast side of property, due south of middle of mercury room #1.
9-A, B, C	Between railroad tracks on southeast side of property, outside of mercury room #1 door.
10-A, B, C	Between railroad tracks on southeast side of property, due south of wall between mercury room #1 and mercury room #2.
11	North side of railroad tracks near southeast corner of property, approximately 50' from east property line.
12	North side of railroad tracks near southeast corner of property, approximately 75' from east property line.

Tenneco Chemicals Incorporated

SOIL SAMPLING PROGRAM

August 21, 1981

(continued)

Sample Number	Sample Location
13	North side of railroad tracks near southeast corner of property, just outside of middle of vinyl department.
14	North side of railroad tracks near southeast corner of property, 2' west of vinyl department west doorway.
15	North side of railroad tracks near southeast corner of property, due south of east reactor vessel in mercury room #1.
16	North side of railroad tracks near southeast corner of property, approximately 3-5' east of mercury room #1 doorway.
17	North side of railroad tracks near southeast corner of property, approximately 2-4' west of mercury room #1 doorway.

*A = 5' depth
B = 10' depth
C = 15' depth

ANALYSIS OF SOIL SAMPLES

COLLECTED AUGUST 21, 1981

Company Tenneco Chemicals
Address P.O. Box 365
City Piscataway State NJ Zip 08854
To Attn. of: Mr. Martin Buys

Job #: 5253d
Date: 9/11/81
Auth.: PO 91948
Lot #: 548
Invoice #:
Sample Date: 8/21/81

REPORT OF ANALYSIS

Sample #	Cation Exchange Capacity (milliequivalants/100g)
6A	13.4
7A	15.4
8A	14.5
9A	13.2
10A	13.2

Company Tenneco Chemical			Job #: 5253d
Address P. O. Box 365			Date: 9/11/81
			Auth.: PO 91948
			Lot #: 548
City Piscataway	State NJ	Zip 08854	Invoice #:
To Attn. of: Mr. Martin Buys			Sample Date: 8/21/81

REPORT OF ANALYSIS

Sample #	Mercury	Barium	Cadmium	Lead
	μg/g (wet weight)			
6A	540	47	39	10
6B	2000	103	76	18
6C	20	79	80	0.60
7A	1250	1.0	1.4	0.10
7B	<0.10	48	15	0.30
7C	20	30	15	0.20
8A	943	47	165	3.9
8B	509	54	181	6.4
8C	240	57	45	0.7
9A	300	20	47	1.0
9B	509	64	78	1.6
9C	140	130	11	<0.2

Company Tenneco Chemical
Address P. O. Box 365
City Piscataway State NJ Zip 08854
To Attn. of: Mr. Martin Buys

Job #: 5253d
Date: 9/11/81
Auth.: PO 91948
Lot #: 548
Invoice #:
Sample Date: 8/24/81

REPORT OF ANALYSIS

μg/g (wet weight)

Sample #	Mercury	Barium	Cadmium	Lead
10A	909	28	105	3.5
10B	250	56	15	0.40
10C	245	50	6.4	<0.10
11 Surface-1 ft	3,600	4,000	1,570	768
11 - 3 ft	700	44	62	25
12	72,000	11,500	552	3,160
13	73,100	2,290	3,060	50,500
14	132,000	3,300	374	7,700
15	16,000	330	662	72
16	21,100	169	710	153
17	144,000	112	1,010	436

Company: Tenneco Chemical	Job #: 5253d
Address: P. O. Box 365	Date: 9/11/81
City: Piscataway State: NJ Zip: 08854	Auth.: 91948
To Attn. of: Mr. Martin Buys	Lot #: 548
	Invoice #:
	Sample Date: 8/21/81

REPORT OF ANALYSIS

	Soil Composite No. 11, 12, 13, 14 EP Leachate (mg/l)	Soil Composite No. 15, 16, 17 EP Leachate (mg/l)
Arsenic	0.023	0.005
Barium	22.1	3.75
Cadmium	62.7	1.13
Chromium	0.005	0.023
Lead	0.030	0.085
Mercury	0.015	0.030
Selenium	<0.0002	<0.0002
Silver	0.007	0.012

Tenneco Chemicals Incorporated

SOIL SAMPLING PROGRAM

September 30, 1981

Sample Number	Sample Location
S (1-3)*	Outside mercury department; A, B, C*
S (4-6)*	Midway between mercury department doors; A, B, C*
S (7-9)*	Outside east door of mercury department; A, B, C
S (10-12)*	Outside east door of vinyl department; A, B, C
S (13-15)	Due south of concrete pads, east of vinyl department;
S (16-19)**	Due south of concrete pads east of vinyl department to end of property line; A, B, C

*Samples (S-1)-(S-11) were resampled after removal of one (1) foot of soil in area A (see following description). Results of these analyses included.

*A - Area between building and railroad tracks.
B - Area between railroad tracks
C - Area between railroad tracks and south retaining wall.

**Samples were composited and collected in groups of three (3) with the exception of samples 16-19, which were a composite of four (4) separate locations.

ANALYSIS OF SOIL SAMPLES

COLLECTED SEPTEMBER 30, 1981

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

Company Tenneco Chemicals
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. John Saraka

Job #: 5253e
Date: 7/21/81
Auth.:
Lot #:
Invoice #:
Sample Date: 9/30/81

REPORT OF ANALYSIS

	Mercury	Lead	Barium	Cadmium
	µg/g (wet weight)			
S (1-3)-1	514	787	1,680	429
S (4-6)-1	1,720	668	308	36.9
S (7-9)-1	5,920	529	7,720	5,780
S (10-12)-1	6,640	612	22,500	11,400
S (13-15)-1	2,030	846	7,830	9,860
S (16-19)-1	933	783	4,340	1,030
S (1-3)-1 1 ft	2,210	560	100	16.8
S (4-6)-1 1 ft	17,400	1,080	1,680	107
S (7-9)-1 1 ft	5,580	312	4,780	778
S (10-11)-1 ft	1,670	400	4,590	7,150
S (1-3)-2	2,570	1,160	235	36.7
S (4-6)-2	5,100	820	1,220	427
S (7-9)-2	4,110	2,260	3,260	751
S (10-12)-2	2,570	1,070	7,790	1,060
S (13-15-2	1,250	3,610	3,530	1,750
S (16-19)-2	353	696	1,300	1,130
S (1-3)-3	804	647	32.6	16.5
S (4-6)-3	383	480	335	92.9
S (7-9)-3	16,100	3,300	349	132
S (10-12)-3	212	177	720	586
S (13-15)-3	540	448	1,010	1,050
S (16-19)-3	19.1	432	1,090	594

Tenneco Chemicals Incorporated

SOIL SAMPLING PROGRAM

May 5, 1982

Sample Number	Sample Location	Sample Depth (in feet)
1	Northeast corner of property, due north of northeast corner of boilerroom	8
2	North side of railroad tracks in the southeast corner of property.	8
3	South side of railroad tracks in the southeast corner of property.	12
4	West side of overflow tank TF-18 on the south central side of property.	12
5	Southwest corner of property, outside west warehouse door.	10
6	Northwest corner of property, outside northside of warehouse.	8

Table A-1

TENNECO CHEMICAL, INC.
ELIZABETH FACILITY
SOIL BORING SAMPLES MAY 5, 1982

Sample: Depth (ft.)	% Solids	Dry Wt Conc (mg/kg) Cd	Pb	Ba	Hg
#1:2-4	67.8	<0.19	13.5	38.2	13.2
4-6	76.4	<0.19	8.25	221	0.085
#2:2-4	85.6	7.91	15.5	67.1	1,100
4-6	75.8	10.6	15.4	172	441
#3:0-2	81.1	4.73	475	59.9	47.2
2-4	89.4	0.756	134	48.5	44.7
4-6	85.2	0.476	16.1	38.6	10.7
6-8	80.1	0.569	6.84	109	8.23
10-12	74.9	0.670	8.68	45.5	43.1
#4:2-4	81.4	0.962	512	60.6	22.5
4-6	83.2	<0.17	14.8	39.2	9.70
8-10	78.5	<0.20	13.7	38.6	5.39
10-12	84.1	0.341	9.78	40.5	11.0
#5:2-4	83.3	0.684	367	193	<0.004
4-6	84.9	2.05	236	188	12.1
6-8	84.8	0.816	34.5	64.8	8.48
8-10	80.4				
#6:0-2	84.6	<0.18	15.7	19.3	1.19
2-4	77.5	<0.18	10.9	75.6	0.40
6-8	84.8	0.715	82.3	94.2	1.44

Table A-2

TENNECO CHEMICAL, INC.
ELIZABETH FACILITY
SOIL BORING SAMPLES MAY 5, 1982
EP LEACHATE

	#2: 2-4' 4-6' (mg/l)	#4: 2-4' (mg/l)	#5: 2-4' 4-6' (mg/l)
Arsenic	0.0029	0.0028	0.0034
Barium	0.015	0.067	<0.013
Cadmium	<0.002	<0.002	0.002
Chromium	<0.02	<0.02	<0.02
Lead	<0.008	<0.008	<0.008
Mercury	0.001	<0.0002	0.001
Selenium	<0.001	<0.001	<0.001
Silver	<0.003	<0.003	<0.003

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
CN 028. Trenton, N.J. 08625

MARWAN M. SADAT, P.E.
DIRECTOR

JORGE H. BERKOWITZ, PH.D.
ADMINISTRATOR

IN THE MATTER OF	:	ADMINISTRATIVE CONSENT
NUODEX INC.	:	ORDER

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP") by N.J.S.A. 13:1D-1 et seq. and the Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq., and duly delegated to the Assistant Director for Enforcement and Field Operations within the Division of Waste Management pursuant to N.J.S.A 13:1B-4.

FINDINGS

1. The Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq. ("ECRA" or "the Act"), was signed into New Jersey State Law by Governor Thomas H. Kean on September 2, 1983, and took effect on December 31, 1983.

2. ECRA required the NJDEP to adopt rules and regulations to implement the Act. On March 6, 1984, NJDEP adopted the Interim ECRA Regulations, N.J.A.C. 7:1-3 ("Regulations") in compliance with the Administrative Procedure Act, N.J.S.A. 52:14B-1 et seq., upon acceptance for filing by the Office of Administrative Law pursuant to N.J.A.C. 1:30-4.4(d).

3. ECRA requires that the owner or operator of an industrial establishment planning to sell or transfer operations (a) notify the NJDEP in writing within five days of the execution of an agreement of sale pursuant to N.J.A.C. 7:1-3.7, (b) submit within 60 days prior to transfer of title a Negative Declaration or Cleanup Plan to the NJDEP for approval, and (c) obtain, upon approval of any necessary Cleanup Plan by the NJDEP, a surety bond or other financial security approved by the NJDEP guaranteeing performance of the Cleanup Plan in an amount equal to the cost estimate for the approved Cleanup Plan.

4. N.J.S.A. 13:1K-13 provides that failure to submit a Negative Declaration or Cleanup Plan pursuant to ECRA is grounds for voiding the sale by NJDEP. Any person who knowingly gives or causes to be given any false information or who fails to comply with the provisions of ECRA is liable for a penalty of not more than $25,000.00 for each occurrence, and each day of a violation of a continuing nature constitutes an additional and separate offense. Further more, any officer or management official of an industrial establishment who knowingly directs or authorizes the violation of any provisions of the Act shall be personally liable for the $25,000.00 penalties for each violation described above.

5. Nuodex Inc. ("Nuodex") owns and operates a chemical manufacturing facility which is located on Magnolia Avenue in Elizabeth City, Union County; said location being further defined as parcels 081210, 081202, 081179, 081179A and 081178 in the tax assessment records of Elizabeth City. At the Elizabeth facility, Nuodex manufactures chemical coatings and additives. Nuodex has informed NJDEP that the Standard Industrial Classification (SIC) numbers which best describe the operations conducted at the Elizabeth facility are 2819 and 2869. Nuodex has further informed NJDEP that hazardous substances are used and hazardous wastes are produced in the operations conducted at the Elizabeth facility. The Elizabeth facility is an Industrial Establishment as defined by ECRA.

6. Nuodex owns and operates a vinyl products manufacturing facility which is located on Nixon Lane, Edison Township, Middlesex County; said location being further defined as Block 397, Lot 2B, Block 398, Lots 15A-1 and 15A-3, and Block 399, Lot 90 in the tax assessment records of Edison Township. Nuodex has informed NJDEP that the SIC number which best describes the operations conducted at the Nixon facility is 3079. Nuodex has further informed NJDEP that the SIC number which best describes the operations conducted at the Nixon facility is 3079. Nuodex has further informed NJDEP that hazardous substances are used and hazardous wastes are produced in the operations conducted at the Nixon facility. The Nixon facility is an Industrial Establishment as defined by ECRA.

7. Nuodex owns and operates an industrial manufacturing facility consisting of two separate plants which are located on Turner Place in Piscataway Township, Middlesex County; said facility being further defined as Block 491B, Lot 5, and Block 461, Lot 1 in the tax assessment records of Pistcataway Township. At the Piscataway facility, Nuodex manufactures concentrated color dispersions and paint tintings in one plant, metallic stearates in the other. Nuodex has informed NJDEP that the SIC Numbers which best describe the operations conducted at the Piscataway facility are 2851 and 2869. Nuodex has further informed NJDEP that hazardous substances are used and hazardous wastes are generated at both plants of the Piscataway facility. The Piscataway facility is an Industrial Establishment as defined by ECRA.

8. Nuodex owns and has operated a chemical manufacturing facility which is located on Industrial Avenue in Fords, Woodbridge Township, Middlesex County; said facility being further defined as Block 62, Lots 2 and 3, Block 93, Lot 100 in the tax assessment records of Woodbridge Township. Nuodex terminated all operations at the Fords facility at the end of February, 1985. At the time of the termination of operations, Nuodex manufactured Formaldehyde, Guaiacol "C" Anti-Skin Agents and Nuosept 95 Preservatives. The facility was also used to store finished products consisting of Colloidal Sulphur, Hexamethylenetetramine and Fungitrol Fungicides. Nuodex has informed NJDEP that the SIC number which best describes such operations conducted at the Fords facility by Nuodex are 2869 and 2833. Nuodex has further informed NJDEP that hazardous substances have been used and hazardous wastes have been generated at the Fords facility. the Fords facility is an Industrial Establishment as defined by ECRA.

9. Nuodex has filed Part A of an application for a permit for existing land disposal units at the Fords facility in accordance with the Resource Conservation and Recovery Act (RCRA) as implemented by NJDEP. Nuodex has also posted approximately $250,000 in financial assurance with NJDEP for estimated closure costs as required by RCRA. The Fords facility may also be governed by the provisions of the "Solid and Hazardous Waste Amendments of 1984" (RCRA reauthorization) which became effective November 8, 1984.

10. On March 13, 1985, NJDEP received the General Information Submission (GIS) of an Initial ECRA Notice from Nuodex for its Fords facility. In the cover letter accompanying the GIS, counsel for Nuodex acknowledged that the submission was not made in a timely manner, and questioned the applicability of ECRA to the cessation of operations at the Fords facility due to the exemption provided by N.J.A.C. 7:1-3.4(b). NJDEP responded to the applicability question by letter of March 19, 1985, stating:

"There is no exemption granted within the statue for facilities permitted under the NJPDES program and no evidence has been presented to the effect that this operation has an approved closure/post-closure plan with appropriate financial assurance posted to claim the exemption under the Solid Waste Management Act. Even were such a plan in force, only those areas specifically addressed would not be subject to ECRA with the remainder of the facility required to meet environmentally acceptable standards as determined by this office."

In that same correspondence, NJDEP informed Nuodex that the GIS for the Fords facility was incomplete, and a checklist detailing deficiencies was enclosed therewith. Nuodex has since provided the information required to complete the GIS, and NJDEP has determined that the GIS for the Ford's facility is now complete.

11. Nuodex, a "closely held" corporation, has advised NJDEP that the shareholders of Nuodex have reached an agreement in principal with Chemische Werke Huls A.G. (Huls), a corporation of the Federal Republic Of Germany, pursuant to which a wholly-owned subsidiary of Huels Corporation, a Delaware corporation and a wholly-owned subsidiary of Huls, will purchase a controlling interest of stock of Nuodex. The sale of the controlling interest of stock will constitute a transfer of ownership of Nuodex as defined by N.J.A.C. 7:1-3.18. Therefore, the sale of the controlling interest of Nuodex stock is a transaction which will subject Nuodex's New Jersey Industrial Establishments to the provisions of ECRA.

12. Nuodex has informed NJDEP that, for business and management reasons, it is in the best interest of both Nuodex and Huls that the proposed transaction be consummated on or about April 30, 1985. Therefore, Nuodex has requested that NJDEP prepare an Administrative Consent Order which, when executed by the parties thereto, would allow the proposed transaction to be consummated prior to Nuodex's completion of all administrative requirements under ECRA.

13. In appropriate cases, NJDEP may allow transactions subject to ECRA to proceed prior to completing the standard ECRA administrative process by execution of an Administrative Consent Order. The Administrative Consent Order specifies a time schedule for completion of ECRA requirements by the

Ordered Party(ies) and provides for financial assurance in a form and amount acceptable to NJDEP prior to consummation of any transactions subject to ECRA. Failure to fully comply with all the terms and conditions of the Administrative Consent Order shall subject the Ordered Party(ies) to the full range of penalties and remedies prescribed in the Act, the Regulations, and the Administrative Consent Order.

ORDER

NOW, THEREFORE, IT IS ORDERED AND AGREED THAT:

14. Nuodex and NJDEP expressly agree that the terms of this Administrative Consent Order apply separately to the Fords facility, Nixon facility, the Elizabeth facility, and the Piscataway facility. Nuodex and NJDEP shall administer the transfer of ownership of each facility as separate and individual ECRA cases. Nuodex shall complete the applicable ECRA program requirements and provide to NJDEP financial assurance separately for the Fords facility, Nixon facility, the Elizabeth facility and the Piscataway facility in accordance with the terms of paragraphs 15 and 16 below. A violation of the provisions of this Administrative Consent Order by Nuodex with respect to any subject facility individually shall authorize NJDEP to fully exercise the remedial measures set forth in this Administrative Consent Order and ECRA, including access to the Financial Assurance pursuant to paragraph 16D, only as those remedies apply to the industrial establishment which is the subject of the violation. A violation of the provisions of this Administrative Consent Order by Nuodex with respect to multiple subject facilities shall authorize NJDEP to fully exercise the remedial measures set forth in this Administrative Consent Order and ECRA, including access to the Financial Assurance pursuant to paragraph 16D, as those remedies apply to each individual Industrial Establishment. NJDEP shall consider such multiple violation as individual separate violations for the purposes of this Administrative Consent Order.

15. ECRA Program Requirements

    A. Nuodex shall submit the Initial Notice required by N.J.A.C. 7:1-3.7 for each subject Industrial Establishment within 45 days from the effective date of this Administrative Consent Order. In the case of the Fords facility, Nuodex shall submit the Site Evaluation Submission portion of the Initial ECRA Notice within 45 days from the effective date of this Administrative Consent Order.

    B. Nuodex shall initiate, complete, and submit to NJDEP the results from any NJDEP-approved sampling plan for each subject Industrial Establishment pursuant to N.J.A.C. 7:1-3.7(d)14 and N.J.A.C. 7:1-3.9 within 90 days from receipt of NJDEP's written approval of the respective sampling plan.

    C. Nuodex shall submit a Negative Declaration or Cleanup Plan as required by N.J.A.C. 7:1-3.10 for each subject Industrial Establishment within 150 days from receipt of NJDEP's written approval of the respective sampling plan.

D. Nuodex shall implement any NJDEP approved Cleanup Plan in accordance with the approved time schedule or defer implementation of all or part of the Cleanup Plan subject to NJDEP approval pursuant to N.J.A.C. 7:1-3.14.

E. Should NJDEP determine that any submittal made under this section is inadequate or incomplete, then NJDEP shall provide Nuodex with written notification of the deficiency(ies), and Nuodex shall revise and resubmit the required information within a reasonable period of time not to exceed thirty (30) days from receipt of such notification.

16. Financial Assurance

A. Nuodex shall obtain and provide to NJDEP financial assurance in the form of a surety bond, letter of credit or other instrument acceptable to NJDEP for each subject Industrial Establishment in the amounts specified as follows:

Fords facility - $2,000,000
Elizabeth facility - $500,000
Nixon facility - $1,000,000
Piscataway facility - $500,000

These financial assurances shall be provided to NJDEP within fourteen days from execution of this Administrative Consent Order. The financial assurance must conform with the requirements of N.J.S.A. 13:1K-9(b)3, N.J.A.C. 7:1-3.10, N.J.A.C. 7:1-3.13, and this Administrative Consent Order.

B. Nuodex shall establish a standby trust fund for each subject Industrial Establishment within fourteen days from the effective date of this Administrative Consent Order. The financial institution which issues the financial assurance shall agree to promptly and directly deposit all amounts up to the total value of the financial assurance into the standby trust fund upon demand by NJDEP.

C. Upon NJDEP approval of a Cleanup Plan, Nuodex shall amend the amount of the financial assurance to equal the estimated cost of implementation of the approved Cleanup Plan, or shall provide such other financial assurance as may be approved by NJDEP in an amount equal to the estimated cost of implementation of the approved Cleanup Plan.

D. In the event that NJDEP determines that Nuodex has failed to perform any of its obligations under this Administrative Consent Order, NJDEP may draw on the financial assurance; provided, however, that before any such demand is made, NJDEP shall notify Nuodex in writing of the obligation(s) with which it has not complied, and Nuodex shall have reasonable time, not to exceed fourteen (14) calendar days, to perform such obligation(s) to NJDEP's satisfaction. Nothing in this paragraph shall prevent NJDEP from collecting stipulated penalties pursuant the terms of this Administrative Consent Order.

17. Additional Conditions of Consent

A. Nuodex and NJDEP acknowledge that a RCRA (Resource Conservation and Recovery Act) permit, as implemented by NJDEP through the provisions of the New Jersey Water Water Pollution Control Act, N.J.S.A. 58:10A-1 et

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seq. and the New Jersey Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., is currently being developed for the Fords facility, and Nuodex has posted approximately $250,000 in financial assurance with NJDEP in connection therewith. Nuodex and NJDEP further acknowledge that, upon NJDEP's approval of a closure/post closure plan for the Fords facility, and upon Nuodex's provision of any additional financial assurance which may be required for implementation thereof, those portions of the Fords facility which are specifically addressed by and included in the approved closure/post closure plan will be exempt from ECRA pursuant to N.J.A.C. 7:1-3.4(b). When this exemption takes effect, NJDEP agrees to review the amount of financial assurance required to be maintained by Nuodex for the Fords facility pursuant to paragraph 16 of this Administrative Consent Order. Depending upon site conditions, as determined by Nuodex through implementation of an NJDEP-approved sampling plan pursuant to paragraph 15B hereof, NJDEP may adjust the required amount of financial assurance to reflect the decrease in the applicability of ECRA to the Fords facility. Any such adjustment shall be made exclusively by NJDEP.

B. Compliance with the terms of this Administrative Consent Order shall not excuse Nuodex from obtaining and complying with all applicable federal and state permits, statutes and regulations while carrying out the obligations imposed by ECRA through this Administrative Consent Order. The execution of this Administrative Consent Order shall not preclude NJDEP from requiring that Nuodex obtain and comply with any permit issued by NJDEP under the authority of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., for the matters covered herein. The terms and conditions of any such permit shall not be pre-empted by the terms and conditions of this Administrative Consent Order even if the terms and conditions of any such permit are more stringent than the terms and conditions of this Administrative Consent Order. Should any of the measures to be taken by Nuodex during the remediation of the ground water and surface water pollution result in a new or modified discharge as defined in the NJPDES regulations, N.J.A.C. 7:14A-1 et seq., then Nuodex shall obtain a NJPDES permit modification from NJDEP prior to commencement of said activity.

C. Nuodex and Huls shall allow the NJDEP access to each subject industrial establishment for the purpose of undertaking all necessary monitoring and environmental cleanup activities. Prior to entry into this Administrative Consent Order, Nuodex shall provide NJDEP with appropriate documentation that Huls shall allow the NJDEP access required herein.

D. NJDEP agrees that it will not bring any action, nor will it recommend that the Attorney General's Office bring any action for failure to comply with (a) the time requirements in N.J.S.A. 13:1K-9(b)1 that NJDEP be notified within five (5) days of execution of agreement of sale or option to purchase and (b) the time requirement in N.J.S.A. 13:1K-9(b)2 that a Negative Declaration or Cleanup Plan be submitted 60 days prior to transfer of title. NJDEP also agrees that it will not bring any action, nor will it recommend that the Attorney General bring any action seeking monetary penalties for Nuodex's failure to meet the time requirements specified in (a) and (b) of this paragraph.

E. No obligations imposed by this Administrative Consent Order (other than paragraph E below) are intended to constitute a debt, claim, penalty or other civil action which could be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police power of the State of New Jersey, intended to protect the public health, safety and welfare.

F. In the event that Nuodex fails to comply with any of the provisions of this Administrative Consent Order, Nuodex shall pay to NJDEP stipulated penalties in the amount of $5,000.00 for each day on which Nuodex fails to comply with any obligation under this Administrative Consent Order; provided, however, that no such stipulated penalty shall be payable by Nuodex with respect to such period that said failure to comply results from Force Majeure.

G. The provisions of this Administrative Consent Order shall be binding upon Nuodex and its officers, directors, employees, agents, successors in interest, assigns, tenants, and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

H. Nuodex's failure to submit an approvable Negative Declaration or Cleanup Plan shall constitute grounds for the NJDEP to void the subject sale or transfer. NJDEP's right to void the subject sale or transfer shall terminate upon NJDEP's written approval of an appropriate Negative Declaration or Cleanup Plan submitted by Nuodex pursuant to this Administrative Consent Order and ECRA.

I. Any submission to be made to NJDEP in accordance with this Administrative Consent Order shall be directed to:

Anthony J. McMahon, Chief
Bureau of Industrial Site Evaluation
Division of Waste Management
CN028
Trenton, NJ 08625

18. Force Majeure

If any event occurs which purportedly causes or may cause delays in the achievement of any deadline contained in this Administrative Consent Order, Nuodex shall notify NJDEP in writing within ten (10) days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length, precise cause or causes, measures taken or to be taken and the time required to minimize the delay. Nuodex shall adopt all necessary measures to prevent or minimize any delay. If any delay or anticipated delay had been or will be caused by fire, flood, riot, strike or other circumstances alleged to be beyond the control of Nuodex, then the time for performance hereunder may be extended by NJDEP for a period no longer than the delay resulting from such circumstances, provided that NJDEP may grant additional extensions for good cause. If the events causing such delay are not found by NJDEP to be beyond the control of Nuodex, failure to comply with the provisions of the Administrative Consent Order shall constitute a breach of the Administrative Consent Order's requirements. The burden of proving that any delay is caused by circumstances beyond Nuodex's control and the length of such delay attributable to those circumstances shall rest with Nuodex. Increases in the costs or expenses incurred in fulfilling the requirements contained herein shall not be a basis for an extension of time. Similarly, delay in completing an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements.

19. Reservation of Rights

This Administrative Consent Order shall be fully enforceable in the New Jersey Superior Court having jurisdiction over the subject matter and signatory parties upon the filing of a summary action for compliance pursuant to the Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq. This Administrative Consent Order may be enforced in the same manner as an Administrative Order issued by NJDEP pursuant to other statutory authority and shall not preclude NJDEP from taking whatever action it deems appropriate to enforce the environmental protection laws of the State of New Jersey in any manner not inconsistent with the terms of this Administrative Consent Order. It is expressly recognized by NJDEP and Nuodex that nothing in this Administrative Consent Order shall be construed as a waiver by NJDEP of its rights with respect to enforcement of ECRA on bases other than those set forth in the ECRA program requirements section this Administrative Consent Order or by Nuodex of its right to seek review of any enforcement action as provided by the Administrative Procedure Act, N.J.S.A. 52:14B-1 et seq. Furthermore, nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of NJDEP to require Nuodex to implement additional remedial measures should NJDEP determine that such measures are necessary to protect the public health, safety and welfare.

20. Nuodex hereby consents to entry of this Administrative Consent Order and waives its right to a hearing concerning the terms hereof pursuant to N.J.S.A. 52:14B-1 et seq.

21. This Administrative Consent Order shall take effect upon the signature of all parties. Upon the signature of all parties, Nuodex may complete the sale or transfer subject to the Administrative Consent Order.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Date: April 29, 1985

By: Joseph Rogalski

Joseph Rogalski, Assistant Director for Enforcement & Field Operations

NUODEX INC.

Date: April 29, 1985

By: Frank X Dwyer

Name: FRANK X. DWYER

Title: PRESIDENT

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AS-85-8426

received
11 JUN 1985

NUODEX INC.
ELIZABETH, NEW JERSEY

GENERAL INFORMATION & SITE EVALUATION SUBMISSIONS FOR THE ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT (ECRA)

MAY 27, 1985

Volume II - Appendices 9-11

pas PRINCETON AQUA SCIENCE

165 Fieldcrest Ave • CN 7809 • Edison, New Jersey 08818-7809 • (201) 225-2000

APPENDIX IX

MERCURY DEPARTMENT

CLOSURE/POST CLOSURE PLAN

CLOSURE PLAN

TENNECO CHEMICALS INCORPORATED
ELIZABETH FACILITY

HAZARDOUS WASTE TREATMENT TANK

LIST OF APPENDICES

TABLE OF CONTENTS

I. PURPOSE AND REQUIREMENTS

A. Purpose

The purpose of the following closure plan is to ensure that the Tenneco Chemicals, Elizabeth manufacturing facility, has considered and prepared for all technical and financial factors necessary to adequately close its hazardous waste treatment tank, ancillary equipment and immediate treatment area (facility components) in regard to site-specific conditions. This closure plan provides for the most appropriate methods and procedures, given all of the site-specific factors, to complete all of the activities necessary to close the facility components in a manner that will minimize the threat of danger to human health and the environment. Therefore, this closure plan, by describing the steps necessary to close the identified components at the Elizabeth facility with its site-specific factors provides Tenneco Chemicals, Elizabeth Plant, with all the closure procedures that conform to Federal guidelines pursuant to the Resource Conservation and Recovery Act of 1976 (RCRA).

This closure plan provides:

1. A description of how and when the facility components will be closed.

2. An estimate of the maximum inventory of wastes in treatment at any time;

3. A description of steps necessary to decontaminate the facility components or render them nonhazardous at closure to the point where the need for further maintenance or controls to protect human health and the environment are minimized;

4. A schedule for final closure activities including the total time required for closure and the time required for intervening closure activities; and

5. An estimate of the maximum cost of closing the facility components.

B. Requirements*

1. The hazardous waste treatment tank closure plan must be submitted to the EPA Regional Administrator at least 180 days before execution of the closure plan or no later than 15 days after:

   a. The termination of interim status (except when a permit is issued to the Elizabeth facility simultaneously with termination of interim status; or

*Only applicable if EPA determines that the facility components are not exempt from closure requirements. See Section II for further details.

b. The issuance of a judicial decree or compliance order under Section 3008 of RCRA to cease receiving wastes or close.

2. The date when closure commences should be within 30 days after the date Tenneco expects to receive the final volume of wastes. Within 90 days after receiving the final volume of hazardous wastes, or 90 days after approval of the closure plan, if that is later, Tenneco must treat, remove from the site, or dispose of onsite all hazardous wastes in accordance with the approved closure plan. A longer period of closure can be approved by the EPA Regional Administrator under the conditions specified in 40 CFR 265.113.

3. When closure is completed, Tenneco must submit to the EPA Regional Administrator, certification both by Tenneco and by an independent registered professional engineer that the treatment tank has been closed in accordance with the specifications in the approved closure plan.

4. Tenneco may amend the closure plan at any time during the active life of the treatment tank. The plan <u>must</u> be amended whenever changes in operating plans or facility design affect the closure plan, or whenever there is a change in the expected year of closure. Regulations referenced in the following closure plan are presented in Appendix A.

II. INTRODUCTION

The following closure plan applies to the mercury treatment unit at the Elizabeth facility that was originally identified in Tenneco's Hazardous Waste Permit Application (Appendix B), submitted to the United States Environmental Protection Agency (EPA), Region II on November 11, 1980 as a hazardous waste treatment unit. On November 17, 1980 EPA promulgated an amendment to 40 CFR 265 that exempts wastewater treatment units regulated under the Clean Water Act (as defined by 40 CFR 260.10 [76a] from the requirements of 40 CFR 265. Subsequent review of the mercury treatment operations in light of the November 17th amendment indicate that the unit is exempt from closure requirements because the unit discharges to a municipal sewer regulated by the Elizabeth Joint Meeting (Appendix C).

Notwithstanding the new amendment the following closure plan for the mercury treatment unit, ancillary equipment and contaminated treatment areas has been prepared in accordance with the applicable sections of 40 CFR 265, Subparts G, H. and J promulgated pursuant to the Resource Conservation and Recovery Act of 1976 (RCRA).

III. FACILITY INFORMATION

A. Facility Identification: Tenneco Chemicals Incorporated

1. Facility Location: 830 Magnolia Avenue, Elizabeth, New Jersey 07201

2. Phone Number: 201-354-7006

3. EPA Identification Number: NJD011246337

4. Facility Description: Tenneco Chemicals' Elizabeth Plant manufactures metal salt dryers in mineral spirits; phenylmercuric acetate in mineral spirits; metal based liquid fungicide; vinyl intermediaries for vinyl stabilizers and dispersion agents for alkyd bases.

   Hazardous wastes (ignitible and EP Toxic) generated from the manufacturing operations are normally solidified in DOT specification drums and removed from the site by licensed hazardous waste haulers for disposal at an approved hazardous waste management facility.

B. Facility Component Subject to Closure: Mercury Treatment Kettle, Ancillary Equipment and Immediate Treatment Area.

1. General Information

   a. Treatment Process Identification Code: T01 (Tank)

   b. Treatment Process Design Capacity: 600 gallons/day

   c. Treatment Tank Capacity: 2,000 gallons

   d. Hazardous Wastes Treated: EP Toxic Mercury Waste (D009)

   e. Treatment Tank and Process Description: The mercury processing operations (Figure 1) at the Elizabeth

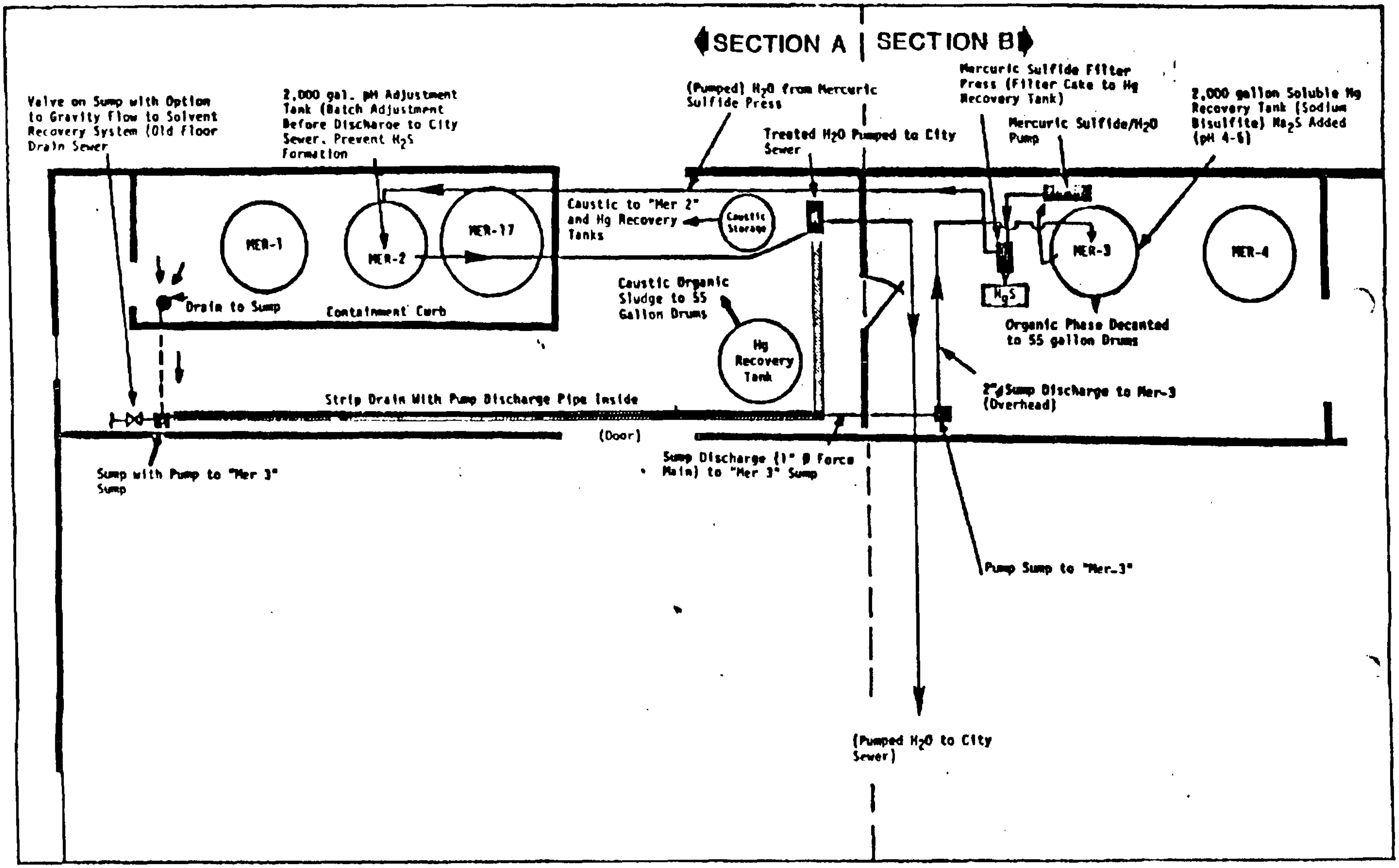

FIGURE 1 MERCURY PROCESSING AREA

facility manufactures phenylmercuric acetate and is isolated in a separate 2,800 ft^2 processing area within the plant. The processing area (Figure 1) is divided into two sections (A & B) by a brick wall. Waste treatment is isolated in the B section, and occupies an area of approximately 1,680 ft^2.

The mercury processing area has a self contained sewer system which is separate from the main plant operations. During the manufacturing process, effluent is collected by floor drains which empty into a 400 gallon wet well for transfer by sump pump to a 2,000 gallon glass lined mercury treatment kettle (Process Code T01). The process effluent contains water solvent and 4 to 5 percent soluble mercury (Hazardous Waste Code: D009). When the treatment kettle (identified as unit MER-3) is filled with approximately 1,800 gallons of process effluent, Na_2S is added to precipitate mercury to an insoluble form (HgS). The insoluble HgS is collected and dewatered by a filter press. The filter cake form the filter pressing

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operation and is returned to the processing operation for mercury recovery. The filtrate from the filter press is transferred to the MER-2 pH adjustment tank and analyzed for mercury by the Dithizone Method. When analysis indicates mercury levels less than 0.02 mg/l, pH is adjusted to between 8 and 9 units, and discharged to a municipal sewer.

Organic solvents present in process effluent that are immiscible and less dense than water will accumulate as an upper layer on the top of the process effluent in the treatment kettle. During the dewatering operation, the organic layer is not removed from the kettle along with insoluble HgS, but is collected separately and analyzed for mercury by the Dithizone Method: If mercury is present in the organic layer (>0.02 mg/l), it is digested in the mercury recovery operation. If mercury is absent (<0.02 mg/l) from the organic layer, it is collected in a drum or drums and incinerated at an approved offsite facility.

C. Waste Characterization

Characteristics of influent to the treatment kettle are presented in Table 1.

D. Maximum Waste Inventory

The maximum amount of waste in the treatment tank would not normally exceed 1,800 gallons, however, as a conservative approach, 2,000 gallons is considered the maximum inventory. Maximum residue from treatment:

1. Organic Solvent - 20 gallons (Ignitible, Normally Recovered)
2. HgS Sludge - 30 pounds (E.P. Toxic, Normally Recovered)

E. Auxillary Equipment Inventory

1. One (1) floor sump pump and associated wet well with a 400 gallon capacity
2. Forty (40) feet of stainless steel pipe
3. One (1) 36 inch barrel filter press

F. Processing Area Data

1. The mercury processing area of the building is approximately 20 feet high with acid brick walls
2. Floors are acid 1½ inch acid brick over concrete, acid brick is sealed with a ¼ inch Stoneclad® (epoxy) overcoat. The Stoneclad® is resistant

Table 1

WASTE CHARACTERIZATION*

(all units in mg/l unless otherwise indicated)

Mercury Treatment Kettle Influent

Parameter	Concentration
pH	5.1
Flash Point (°F)	91
Total Suspended Solids	116
% Solids	0.5%
Total Organic Carbon	2,800
Mercury	6.5
Cadmium	0.181
Copper	0.046
Zinc	0.207
Nickel	0.134
Lead	0.476

to naptha and has been used in other mercury processing industries (i.e. PPG in Lake Charles, Louisiana)

3. Housekeeping: Floors are cleaned once per week by scrubbing with caustic and flushing with water. Wash water is drained to the MER-3 mercury treatment tank. Cleaning operations normally take approximately one hour and requires two men with protective equipment and respirators.

IV. CLOSURE PROCEDURE

A. Introduction

The following closure procedures apply only to the MER-3 mercury treatment kettle, ancillary equipment and contaminated portions of the immediate treatment area. The procedure does not address the closure of the entire mercury processing operations area. Closure of mercury processing operations area would involve, at a maximum, removal of all equipment, building demolition and offsite disposal of all contaminated equipment and debris at an approved facility.

Preliminary execution of the following plan shall be performed by Tenneco personnel (i.e. final waste treatment). All other operations shall be performed by experienced hazardous material clean-up contractors.

B. General

1. Treat remaining waste load in the mercury treatment kettle.
2. Suspend mercury manufacturing and processing operations.

3. Secure the mercury treatment area (Figure 1, Section B) to prevent the entrance of unauthorized personnel and uncontrolled release of decontamination residues and vapors. Broken windows, vents, doorways, drains, etc., shall be sealed to minimize the release of contaminants to the other areas of the building or outside property.
4. Determine ambient air concentrations for mercury inside and outside the building (downwind).
5. Establish continuous recording mercury monitoring stations inside and outside which will be activated when the decontamination procedure is initiated.
6. At a minimum, protective clothing and breathing apparatus shall be used by all personnel involved in the closure procedure. If the indoor mercury concentration exceeds 0.001 ppm, protective clothing and self-contained breathing apparatus or air-line respirators shall be used. All personnel involved in the closure procedure shall be properly trained in the use of protective equipment and in the handling of hazardous materials in accordance with RCRA regulations (40 CFR 265.26). All protective equipment shall comply with NIOSH and OSHA standards .

7. If, at any time during the execution of the closure procedure, the outdoor mercury monitors indicate a concentration in excess of 0.003 ppm, the closure procedure will be suspended until the source of the mercury release can be determined and sealed.

C. <u>Mercury Treatment Kettle Closure (Tank MER-3)</u>

1. Wearing protective clothing and respirators, visually inspect the interior of the empty treatment kettle. If solid residue is visible within the tank, remove the residue with a high pressure hose and pass the wash water through the filter press and collect the filtrate in the MER-2 pH adjustment tank. Transfer the solids from the filter press to a labeled DOT-specification drum for disposal at the conclusion of the closure operations.
2. Fill the treatment kettle from the wet well with a 1:1 concentrated nitric acid and water mixture and allow to stand in the tank for 24 hours. The nitric acid will solubilize and remove any residual mercury in the wet well, pump, piping and tank.
3. After 24 hours drain the acid wash water from the treatment kettle through the filter press to a DOT specification tank truck which will dispose of the wash water at an approved offsite facility.

4. Fill the tank with water using a high pressure hose, when full, analyze a representative sample for mercury. If the mercury concentration is less than 0.02 mg/l discharge through the filter press to the MER-2 pH adjustment tank for ultimate discharge to the municipal sewer. If the mercury concentration is greater than 0.02 mg/l, discharge to the tank truck used in Step 3.
5. Continue washing the treatment kettle (at least two additional times) until the mercury concentration is less than 1 ug/l (detection limit for Dithizone Method). When mercury is no longer detected, the treatment tank can be considered decontaminated.

D. <u>Auxillary Equipment and Treatment Area Decontamination</u>

1. Review the general closure procedures in Section IV.B, 1 through 7 before initiating decontamination operations.
2. Thoroughly clean the mercury processing area in accordance with the housekeeping procedures identified in Section III.E.4 and collect residue in the wet well.
3. Determine degree of building contamination by removing duplicate two inch core samples to ascertain if mercury has penetrated into the buildings floor and walls. A total of eight (8) core samples, four inches in depth, will be taken from the following areas:

5. If analysis indicates that the first inch (¼+¼+½) of the floor or walls contain mercury (as defined by EP Toxicity) in excess of 0.2 mg/l repeat the analysis at one inch intervals. If mercury has contaminated the acid brick or underlying concrete to an EP Toxicity concentration in excess of 0.2 mg/l, Tenneco will evaluate by further study, the feasibility of decontamination (Step 6 in Closure Procedure) as opposed to demolition and disposal of the building and contents as a hazardous waste. For the purpose of this plan, decontamination is considered feasible only if the top ¼ inch is contaminated.

6. If decontamination is determined to be feasible or necessary, the following sequence of events will occur:

   a. Steam clean the entire mercury treatment area including tank exteriors, walls and fixtures

   b. Remove water generated from the cleaning operation with a vacuum truck for subsequent disposal at an approved facility

   c. If contamination is only within the first ¼ inch of the surface, remove the Stoneclad® layer with a scabbler. Load debris into DOT specified drums and dispose at an approved offsite facility

d. Resurface the acid brick with a new Stoneclad® or equivalent layer

7. If contamination has penetrated the acid brick, removal of the building will be evaluated

8. The closure procedure shall be considered complete when all the manifests for wastes generated during closure execution have been returned by the approved hazardous waste disposal facility to Tenneco. When the closure procedure is complete, the closure plan will be certified by an independent registered professional engineer and submitted to the Regional Administrator of the United States Environmental Protection Agency, Region II, by both the engineer and Tenneco in accordance with 40 CFR 265.15 (if applicable).

9. Remove decontaminated tank and ancillary equipment (optional).

V. POST CLOSURE MAINTENANCE AND MONITORING

Post closure maintenance and monitoring is not required since all potentially hazardous materials and residues will be removed and disposed of properly at an approved offsite facility.

VI. Closure Schedule

Final closure of the mercury treatment tank (MER-3), ancillary equipment and treatment area is not expected to occur until Tenneco decommissions the Elizabeth facility, which at this time cannot be predicted. The closure procedure is expected to require 36 days (excluding weekends) from the date the plan is implemented.

The closure schedule is summarized in Table 2 and accounts for the time needed to execute each intervening activity described in the closure plan (Section IV). The time required for execution of each phase of the plan has been developed from 1981 hazardous waste cleanup contractor time and cost estimates.

It should be noted that the projected time requirements assume that contamination of the mercury treatment area would not exceed ¼ inch in depth from the surface.

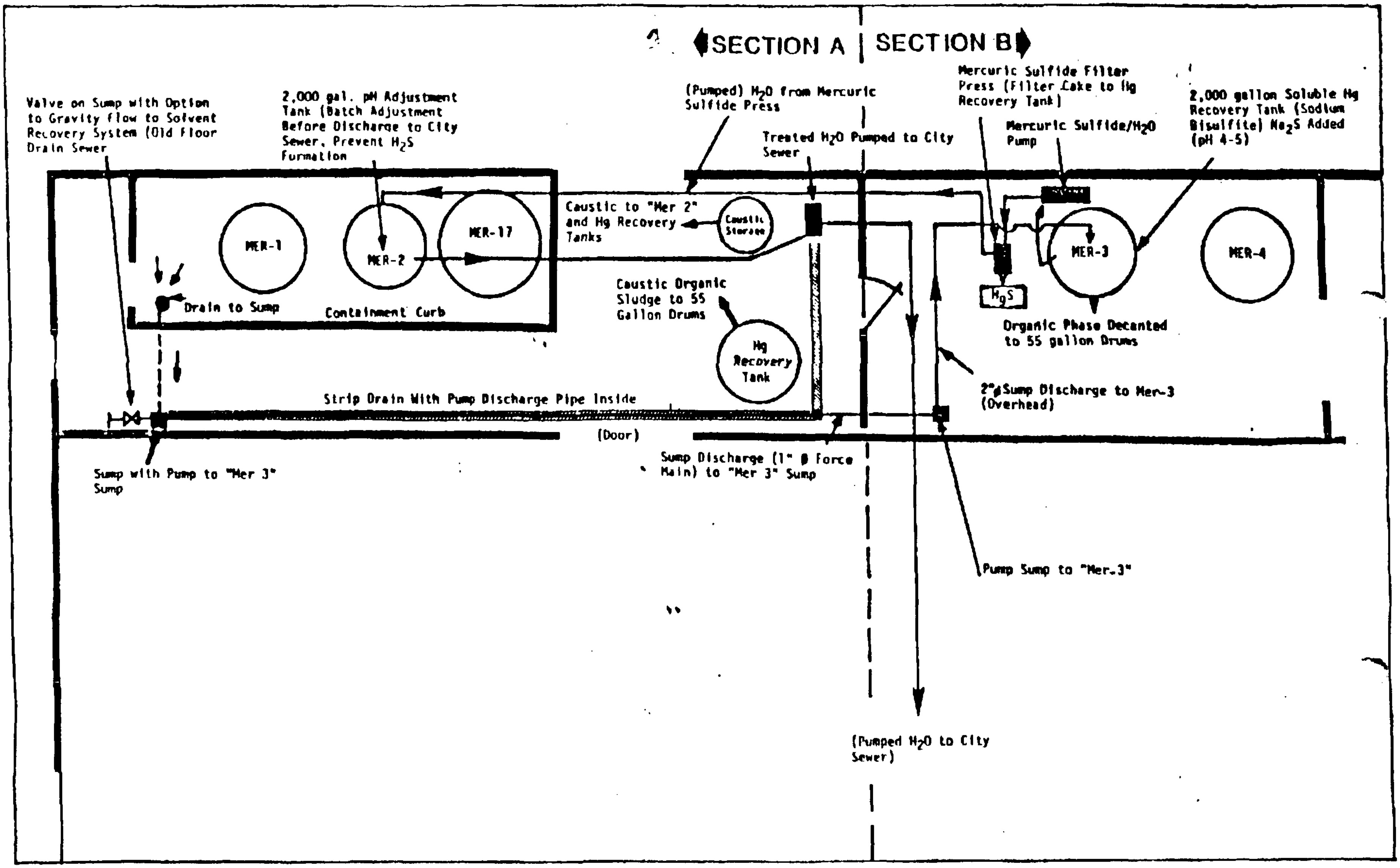

FIGURE 1 MERCURY PROCESSING AREA*

*Refer to Appendix E for Expanded Floor Plan and Equipment Inventory

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Table 2

MERCURY TANK AND TREATMENT AREA
CLOSURE SCHEDULE SUMMARY

(Time in Days)

Intervening Activity	Time Required for Activity*	Elapsed Days From Initiation of Plan (Excluding weekends)
A. Initiate Closure Plan		(Date)
1. Treat Remaining Waste Volume	3	
2. Secure Mercury Treatment Area	1	
3. Establish Monitoring Stations	1	
Subtotal	5	5
B. Mercury Treatment Tank Closure		
1. Rinse Tank and Fill With Acid	1	
2. Remove Acid and Rinse Until Hg is Nondetectable	1	
Subtotal	2	7
C. Treatment Area Decontamination		
1. Clean Mercury Treatment Area	2	
2. Floor Coring	1	
3. Determine Degree of Contamination	2	
4. Steam Clean Treatment Area	4	
5. Remove Top ½ Inch from Floor	2	
6. Resurface Floor	2	
Subtotal	13	20
D. Waste Disposal		
1. Transportation to Disposal Facility, Disposal and Manifest Returned to Tenneco	14	34
E. Professional Certification	2	36
F. Total Time Required for Closure		36

*Assumes 10 hour work day by hazardous waste cleanup contractor.

VII. CLOSURE COST ESTIMATE

It is estimated that the closure and related decontamination of the mercury treatment tank ancillary equipment and treatment area will cost approximately $72,000 (1981 dollars) at the maximum extent of operation. This cost estimate assumes that all closure activities outlined in Section IV are executed in sequence during five day work weeks. Table 3 presents a summarized breakdown of the estimated costs used to arrive at the total closure cost.

The closure cost estimates were derived from 1981 hazardous waste clean-up contractor and disposal cost information as well as equipment and materials price schedules. The premises and calculations used to develop the closure cost estimates are presented in Appendix D.

It should be noted that the cost estimates do not include equipment removal and resale value or building demolition and removal since it has not been determined by Tenneco that such activities will occur or are necessary.

Table 3

MERCURY TANK AND TREATMENT AREA*
CLOSURE COST ESTIMATE SUMMARY

(In 1981 Dollars)

Intervening Activity	Intervening Activity Cost Breakdown	Total Intervening Activity Cost
A. Initiate Closure Plan		
1. Cost Factors: Security		
a. Secure Mercury Treatment Area	$1,800	
b. Contingency (10%)	200	
Subtotal		$ 2,000
2. Cost Factors: Hg Monitoring		
a. Equipment & Training	5,100	
b. Contingency (25%)	1,300	
Subtotal		6,400
3. SUBTOTAL--A		8,400
B. Mercury Treatment Tank Closure		
1. Cost Factors: Acid Cleaning		
a. Rinse and Fill with Acid	3,500	
b. Contingency (25%)	900	
Subtotal		4,400
2. Cost Factors: Acid Removal and Disposal		
a. Acid Removal, Rinse, Analysis and Waste Disposal at Approved Facility	7,200	
b. Contingency (30%)	2,200	
Subtotal		9,400
3. SUBTOTAL--B		13,800

*Costs derived in Appendix D from 1981 hazardous waste cleanup contractor price schedules and cost estimates.

Table 3 (continued)

Intervening Activity	Intervening Activity Cost Breakdown	Total Intervening Activity Cost
C. Treatment Area Decontamination		
1. Cost Factors: Determine Degree of Contamination		
a. Clean Treatment Area, Floor Core Removal and Analysis	$ 7,400	
b. Contingency (20%)	1,500	
Subtotal		$ 8,900
2. Cost Factors: Decontamination		
a. Steam Cleaning, Removal of Floor Surface	16,500	
b. Contingency (25%)	4,100	
Subtotal		20,600
3. Cost Factors: Waste Disposal		
a. Disposal of Liquid and Drum Wastes Generated During Decontamination (includes drum wastes from tank closure)	9,600	
b. Contingency (25%)	2,400	
Subtotal		12,000
4. Cost Factors: Resurface Floor		
a. Resurface Floor with ¼ Inch of Epoxy Sealant	6,600	
b. Contingency (10%)	700	
Subtotal		7,300
5. SUBTOTAL--C		48,800
D. Professional Certification	1,000	1,000
E. TOTAL ESTIMATE CLOSURE COST		$72,000

APPENDIX A

EPA EXEMPTION JUSTIFICATION, CHARACTERISTICS OF HAZARDOUS WASTE (40 CFR 261) AND INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE FACILITIES (40 CFR 265)

APPENDIX B

HAZARDOUS WASTE PERMIT APPLICATION

FORM 1 GENERAL — EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program
(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F NJD011246337

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill–in area below. Also, if any of the preprinted data is absent (*the area to the left of the label space lists the information that should appear*), please provide it in the proper fill–in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI (*except VI-B which must be completed regardless*). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold–faced terms.

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility (*either existing or proposed*) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X	
D. Is this a proposed facility (*other than those described in A or B above*) which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP TENNECO CHEMICALS, INC. ELIZABETH PLANT

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
LAREAU, R. R. PLANT MANAGER	201 354 7006

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 30 MAGNOLIA AVENUE

B. CITY OR TOWN	C. STATE	D. ZIP CODE
ELIZABETH	NJ	07201

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 30 MAGNOLIA AVENUE

B. COUNTY NAME

UNION

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE (if known)
ELIZABETH	NJ	07201	

CONTINUED FROM THE FRONT

SIC CODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
2819	(specify) INDUSTRIAL INORGANIC CHEMICALS	7	(specify)
C. THIRD		**D. FOURTH**	
	(specify)	7	(specify)

OPERATOR INFORMATION

A. NAME: TENNECO CHEMICALS, INC.

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

Answer: P (specify)

D. PHONE (area code & no.): A 201 646 3800

E. STREET OR P.O. BOX: PARK 80 PLAZA WEST-1

F. CITY OR TOWN: SADDLE BROOK | G. STATE: NJ | H. ZIP CODE: 07662

IX. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO

EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)	
N NONE	9 P NONE	
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**	
NONE	9	(specify) See attached sheet
C. RCRA (Hazardous Wastes)	**E. OTHER (specify)**	
NJD011246337	9	(specify)

MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

NATURE OF BUSINESS (provide a brief description)

Tenneco Chemicals' Elizabeth Plant manufactures metal salt dryers in mineral spirits; phenylmercury acetate in mineral spirits; metal based liquid fungicide; vinyl intermediaries for vinyl stabilizers and dispersion agents from alkyd bases.

CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
. Okun, Vice President and General Manager - Coatings and Colorants	[signature]	11/14/80

COMMENTS FOR OFFICIAL USE ONLY

New Jersey Department of Environmental Protection

Air Pollution Permits

CT 6315

CT 29727

CT 818-

CT 44123

CT 45531

CT 19463

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA)

I. EPA I.D. NUMBER: N J D 0 1 1 2 4 6 3 3 7

FOR OFFICIAL USE ONLY

APPLICATION APPROVED | DATE RECEIVED (yr., mo., & day) | COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

X 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

2. NEW FACILITY *(Complete item below.)*

70 01 01 — FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

1. FACILITY HAS INTERIM STATUS

2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage		
CONTAINER (barrel, drum, etc.)	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

DUP

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	[illegible] 0 1	600	U		7				
2					8				
3					9				
4					10				

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... from the front

... OCESSES (continued)

PACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES ... FOR EACH PROCESS ENTER ... CLUDE DESIGN CAPACITY.

DESCRIPTION OF HAZARDOUS WASTES

HAZARDOUS WASTE NUMBER — Enter the four-digit number from 40 CFR, Subpart D for each listed hazardous waste you w... ... in hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four-digit number(s) from 40 CFR, Subpart C that describes the charact... tics and/or the toxic contaminants of those hazardous wastes.

ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be handled ... . For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that w... ... possess that characteristic or contaminant.

UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the ... are.

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

... cility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure ta... ... unt the appropriate density or specific gravity of the waste.

. PROCESSES

PROCESS CODES.

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above. (2) Enter "000" in the extreme right box of Item IV-D(1), and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by ... an one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV (shown in line numbers X-1, X-2, X-3, and X-4 below) — A facility will treat and dispose of an estimated 900 pounds ... of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes ... rosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

CONTINUE ON PAGE

Note: [illegible] before completing if you have more than 26 wastes to list. Form Approved OMB [illegible]

EPA I.D. NUMBER (enter from page 1): N J D 0 1 1 2 4 6 3 3 7

FOR OFFICIAL USE ONLY: DUP | DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

Line No.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D 0 0 9	1,300,000	P	T 0 1	

EPA Form 3510-3 (6-80) CONTINUE ON REVERSE

(enter "A", "B", "C", etc. behind the "3" to identify an additional page)

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E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO.

NJD011246337

FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

PHOTOGRAPHS

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

III. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
40 40 56	74 12 30

FACILITY OWNER

If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
	G		

OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
un, Vice President and General Man_er - Coatings and Colorants	[signature]	11/14/80

OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type)	B. SIGNATURE	C. DATE SIGNED

CONTINUE ON PAGE

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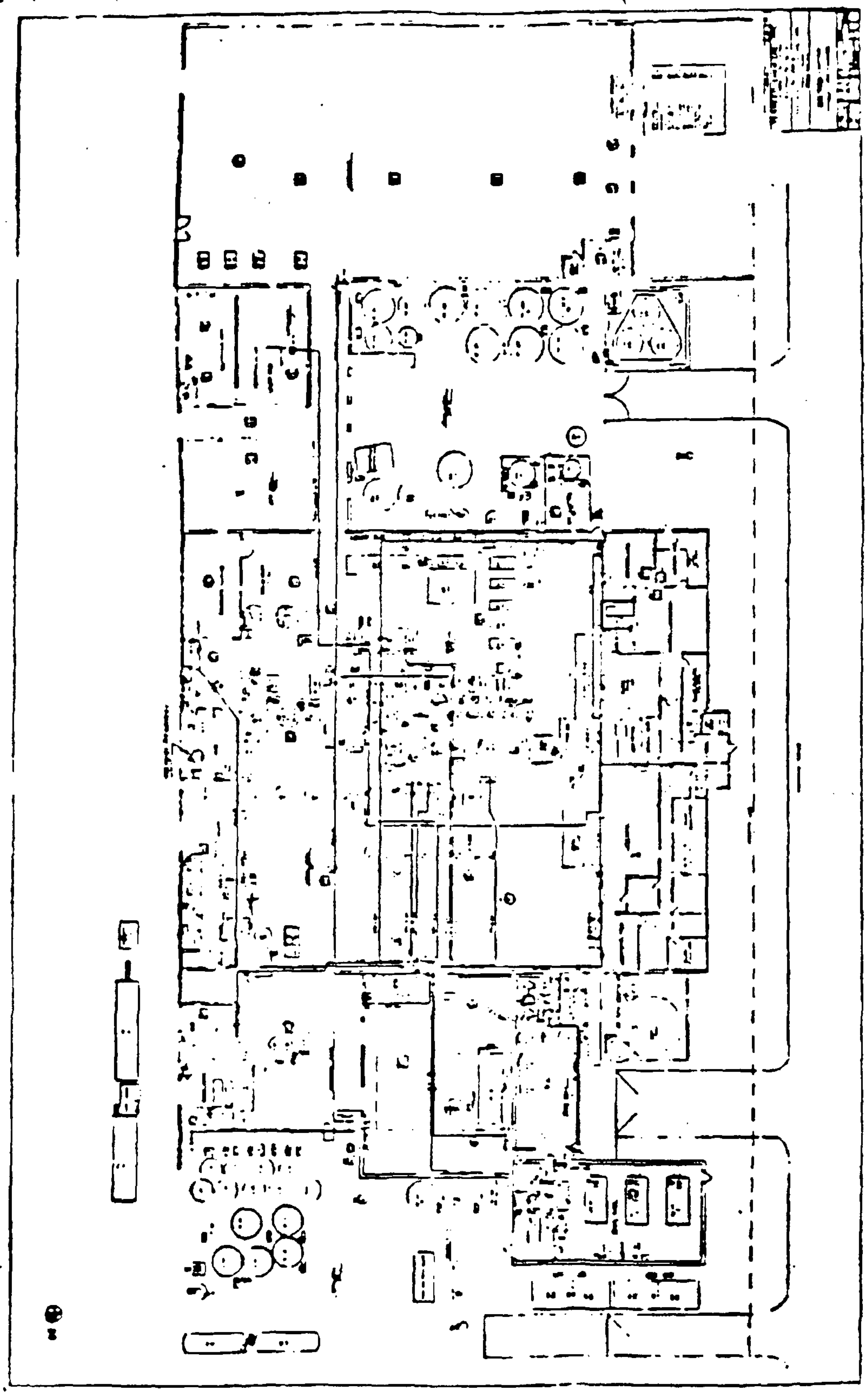

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APPENDIX C

ELIZABETH SEWER ORDINANCE

ORDINANCE NO. 10[illegible]

AN ORDINANCE OF THE CITY OF ELIZABETH SETTING FORTH RULES AND REGULATIONS APPLICABLE TO ALL USERS WHICH GOVERN THE (1)THE USE OF PUBLIC AND PRIVATE SEWERS SEWERS AND DRAINS, (2)SEWAGE DISPOSAL, (3)THE INSTALLATION AND CONNECTION OF BUILDING SEWERS AND (4)THE DISCHARGE OF WATERS AND WASTE INTO THE PUBLIC SYSTEM; AND ESTABLISHES PENALITIES FOR VIOLATION OF SUCH RULES AND REGULATIONS.

BE IT ORDAINED by the CITY COUNCIL of the CITY OF ELIZABETH as follows:

SECTION 1 DEFINITIONS

Unless the contents specifically indicate otherwise, the meaning of terms used in this Ordinance shall be as follows:

Subdivision 1

"Engineer" shall mean the City Engineer of the City of Elizabeth, or his authorized Deputy, Agent or Representative.

Subdivision 2

"Sewage" shall mean and include the water-carried human or animal wastes from residences, buildings, industrial establishments or other places, together with such ground water infiltration and surface water as may be present. The admixture with sewage as above defined of industrial waste or other wastes as hereinafter defined, also shall be considered "sewage" within the meaning of this Ordinance.

Subdivision 3

"Combined Sewage" shall mean a mixture of rainfall run-off and sewage.

Subdivision 4

"Sewer" shall mean a pipe or conduit for carrying sewage and to which storm, surface and ground waters are not intentionally admitted.

Subdivision 5

"Combined Sewer" shall mean a pipe or conduit for carrying sewage to which storm and surface waters are intentionally admitted.

Subdivision 6

"Public Sewer" shall mean a sewer in which all owners of abutting properties have equal rights and is controlled by public authority.

Subdivision 7

"Private Sewer" shall mean a building sewer and connection or other sewer not controlled by a municipality or other public authority.

Subdivision 8

"Joint Sewer" as used herein shall be construed to include the joint outlet or trunk sewer constructed by the several member municipalities forming the "Joint Meeting" under a contract dated March 15, 1901; the Supplementary Joint Trunk Sewer and Sewage Disposal Plant constructed under a contract between the member municipalities dated June 1, 1926, and contract dated March 9, 1931; or shall mean any trunk sewer theretofor or thereafter constructed and maintained by the Joint Meeting.

Subdivision 9

"Sewage Treatment Plant" shall mean any arrangement of devices and structures used for treating sewage.

Subdivision 10

"Industrial Wastes" shall mean the liquid wastes from industrial manufacturing processes, trade, or business as distinct from sanitary sewage.

Subdivision 11

"Garbage" shall mean solid wastes from the preparation, cooking and dispensing of food and from handling, storage and sale of produce.

Subdivision 12

"Properly Shredded Garbage" shall mean the garbage that has been shredded to such degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particles greater than one-half inch in any dimension.

Subdivision 13

"Building Drain" shall mean that part of the lowest horizontal piping of the drainage system which receives the discharge from soil, waste and other drainage pipes inside the walls of the building, and conveys it to the building sewer beginning five feet outside the inner face of the building wall, and shall mean and include a House Sewer or a Private Sewer.

Subdivision 14

"Building" shall mean any structure contained within exterior walls, and from which sewage orginates.

Subdivision 15

"Building Sewer" shall mean the extension from the building drain to the public sewer or to an existing extension from a public sewer when available.

Subdivision 16

"BOD", denoting Biochemical Oxygen Demand, shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard Laboratory procedure for five days at twenty degrees Centigrade, expressed in milligrams per liter.

Subdivision 17

"pH" shall mean the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution.

Subdivision 18

"Suspended Solids" shall mean those solids that either float on the surface of, or in suspension of water, sewage or other liquids and which are removable by laboratory filtration.

Subdivision 19

"Chemical Oxygen Demand" (COD) shall mean the measure of the organic matter present in the sewage as determined by the dichromatic reflux method and expressed in milligrams per liter (ppm).

Subdivision 20

"Chlorine Demand" shall mean the amount of chlorine expressed in milligrams per liter, or parts per million by weight, which will complete the normal reactions with all chemicals and materials in the sewage leaving an excess of 0.1 milligram per liter, (0.1 parts per million by weight), after thirty minutes contact time at room temperature of approximately 70°F.

Subdivision 21

"Grease or Fats" shall mean any material which is extractable from an acidified sample of a waste by hexane or other designated solvent.

Subdivision 22

"Petroleum Hydrocarbons" shall mean that portion of the total extractable grease or fats, which is not retained on an activated alumina absorption column after elutriating with hexane.

Subdivision 23

"Floatable Oil": oil, fat, or grease in a physical state which will separate by gravity from wastewater through treatment in an approved pretreatment facility. A wastewater shall be considered free of "floatable oil" if it is properly pretreated in such a manner that the discharged wastewater does not interfere with the wastewater facilities.

Subdivision 24

"Heavy Metals": the electro-negative metals with a density greater than 5 grams per cubic centimeter, including but not limited to lead, chromium, mercury, nickel, and zinc, plus the non-metallic element arsenic.

Subdivision 25

"Non-Stationary Source": any mobile vehicle, piece of equipment or appurtenance thereof that is utilized in the discharge of waste or wastewater to any sewer or natural outlet. The terms includes, but is not limited to, tank trunks and dump trunks as well as associated equipment and appurtenances. Fixed, permanent or semi-permanent equipment is excluded from the category of non-stationary source, and is regulated elsewhere in this ordinance.

Subdivision 26

"Cooling Water" shall mean the water discharged from any system of condensation, air conditioning, cooling, refrigeration or other, but which shall be free from odor and oil. It shall contain no polluting substances which would produce BOD or suspended solids each in excess of ten parts per million by weight.

Subdivision 27

"Natural Outlet" shall mean any outlet into a water-course, pond, ditch, lake or other body of surface or ground water.

Subdivision 28

"Watercourse" shall mean a channel in which a flow of water occurs, either continuously or intermittently.

Subdivision 29

"Person", "Enterprise", "Establishment" or "Owner" shall mean any individual, firm, company, partnership association, society, corporation (public or private) or group, including heirs, executors, administrators or assigns, using the sewage works or severage system.

Subdivision 30

"Normal Sewage" shall be regarded as normal for the City if analyses show, by weight, a daily average of not more than one-hundred-eighty parts per million of suspended solids, not more than two hundred-ten parts per million of BOD, and not more than twenty-five parts per million of chlorine demand each. One part per million equals 8.34 pounds per million gallons.

Subdivision 31

"Sanitary Sewage" shall mean sewage discharging from the sanitary conveniences of dwellings (including apartment houses and hotels), office buildings, factories, or institutions, and free from storm and surface waters, and industrial wastes.

Subdivision 32

"Slug" shall mean any discharge of water excluding rainfall runoff sewage, or industrial waste which in concentration of any given constituent or in quantity of flow exceeds for any period of duration longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour concentration or flows during normal operation.

Subdivision 33

"Unpolluted Water or Waste" shall mean any water or waste containing none of the following: free or emulsified grease or oil; acid or alkali; phenols or other substances imparting taste or odor in receiving waters; toxic or poisonous substances in suspension, colloidal state, or solution; and noxious or odorous gases. It shall contain not more than ten thousand parts per million by weight of dissolved solids, of which not more than two thousand five hundred parts per million shall be as chloride with permissible volumes subject to review by the Engineer, and not more than ten parts per million each of suspended solids and BOD. The color shall not exceed fifty parts per million.

Subdivision 34

"Other Wastes" shall mean and include garbage, refuse, decayed wood, sawdust, shavings, bark, sand, lime, cinders, ashes, offal, oil, tar, dye stuffs, acids, chemicals, and all other discarded matter not sewage or industrial waste.

Subdivision 35

"Sewer System", "Sewage Works", or "Sewerage System" shall mean and include all sewer pipes and other appurtenances which are used or useful in whole or part in connection with the collection, treatment or disposal of sewage, industrial waste and other wastes and which are either owned, or operated, or maintained or used by the CITY OF ELIZABETH individually or jointly with other municipalities, including sewage pumping stations and sewage treatment and disposal works.

Subdivision 36

"Part" as used in relation to the term "Sewer System" shall mean and include all lateral sewers, or all combined sewers, or all branch sewers, or all interceptor sewers, or all trunk sewers, and any sewage treatment and disposal works, each part with necessary appurtenances including sewage pumping stations.

Subdivision 37

"Storm Sewer" or "Storm Drain" shall mean a pipe or conduit which carries storm and surface water and drainage, but excludes sewage and industrial wastes. It may, however, carry cooling water or other unpolluted waters.

Subdivision 38

"Pretreatment": treatment given to waste by other than residential users prior to its direct or indirect discharge to Municipal or Joint Meeting wastewater facilities to remove illegal and/or undesirable waste constituents, or to reduce the strength of waste prior to discharge to publically owned wastewater facilities.

Subdivision 39

"Shall" is mandatory; "may" is permissive.

Subdivision 40

"City" shall mean the CITY OF ELIZABETH, in the County of Union, State of New Jersey.

Subdivision 41

"Joint Meeting" shall mean the municipalities of the City of East Orange, the Township of Hillside, the Town of Irvington, the Township of Maplewood, the Township of Millburn, the City of Newark, the Borough of Roselle Park, the Village of South Orange, the City of Summit, the Township of Union and the Town of West Orange, organized in Joint Meeting pursuant to 40:63-68, et seq., of the Revised Statues of the State of New Jersey under the terms of a contract dated June 1, 1926, as supplemented, in the matter of an outlet sewer and treatment plant for said municipalities, and, when the context requires, shall mean the Executive Director or his authorized deputy, agent or representative.

Subdivision 42

"Director of Finance" shall mean and include the Director of the Department of Finance of the CITY.

Subdivision 43

"Plumbing Code" shall mean the Plumbing Code of the CITY as ammended.

Subdivision 44

"Plumbing Inspector" shall mean the Plumbing Inspector of the CITY.

Subdivision 45

"Director of Public Works" shall mean the Director of the Department of Public Works of the CITY.

Subdivision 46

"NPDES": National Pollutant Discharge Elimination System.

Subdivision 47

"USEPA" refers to the United States Environmental Protection, or sucessor agency.

Subdivision 48

"NJDEP" refers to the State of New Jersey Department of Environmental Protection, or successor agency.

Subdivision 49

"Major Industry": an industrial user of Municipal or Joint Meeting wastewater facilities that: (a) has a flow of 50,000 gallons or more per work day; (b) has in its waste toxic substances injurious to the treatment process or sewer system; (c) is found by USEPA, NJDEP, Joint Meeting or Municipality to have a significant impact, either singly or in combination with other contributing industries, on Municipal or Joint Meeting wastewater facilities or upon the quality of effluent from these wastewater facilities; or (d) has a detrimental effect upon human health or welfare.

SECTION 2 USE OF PUBLIC SEWER REQUIRED

A. It shall be unlawful to place, deposit, or permit deposit in an unsanitary manner upon public or private property within the CITY or in any area under the jurisdiction of said CITY, any human or animal excrement, garbage or other objectionable waste.

B. It shall be unlawful to discharge to any natural outlet within the CITY or in any area under the jurisdiction of said CITY any sanitary sewage, industrial wastes or other polluted waters, except where suitable treatment has been provided in accordance with the subsequent provisions of this ORDINANCE and the public health law.

C. So far as is practicable, industrial waste shall be discharged into the CITY'S Sewer System with or without pretreatment, provided the consent of the Engineer is first obtained, and the rules, regulations and standards hereinafter prescribed are complied with, in the judgment of the Engineer.

D. Written approval by the Engineer is required for all new discharges of industrial wastes after the effective date of this ORDINANCE. These shall include all wastes in which the quantity, temperature or chemical characteristics are altered in operation procedures and equipment changes.

E. The discharge of industrial cooling water to the CITY'S Sewer System is not permitted except by specific written approval by the Engineer.

F. It shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage, within any area where public sewer service is available within one hundred-fifty feet of the property line.

G. The owner of all houses, buildings or property used for human occupancy, employment, recreation or other similar purposes, situated within the CITY and abutting on any street, alley or right-of-way, in which there is now located or may in the future, be located a public sanitary sewer of the CITY is hereby required, at his expense, to install suitable toilets and facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of this Ordinance within ninety days after the date of official notice from the Plumbing Inspector to do so, provided that said public sewer is within one hundred-fifty feet of the property line. In no event shall the CITY be required to furnish a public sewer to a point within 150 feet of any property line.

H. No portion of this Article shall be construed to interfere with or modify the requirements of design, inspection and approval which are imposed by the appropriate health officials, and the State and City Health Departments.

SECTION 3 BUILDING SEWERS AND CONNECTIONS

A. No person shall uncover, make any connection with, or opening into, or use, alter or disturb any public sewer or appurtenance thereof without first obtaining a written sewer permit in accordance with the regulations as established by the CITY, including the Plumbing Code of the CITY as amended.

B. A Sewer Permit shall not be issued without first furnishing the Engineer with Plans and Specifications or other information considered pertinent for compliance with this ordinance.

C. All costs and expenses incidental to the installation and connection of the building sewer shall be borne by the owner of the property being served. The owner shall indemnify the CITY for any loss or damage that may directly be occasioned by installation of the building sewer.

D. A separate independent building sewer shall be provided for every building except where one building stands at the rear of another or an interior lot and no sewer is available or can be constructed to the rear building through an adjoining alley, courtyard or driveway. Under such conditions, the building sewer from the front building may be extended to the rear building and the whole considered as one building sewer.

E. Old building sewers may be used in connection with new buildings only when they are found, on examination, and tested by the Plumbing Inspector to meet all requirements of this ORDINANCE.

F. The building sewers shall be constructed in accordance with the applicable portions of the CITY's Plumbing Code, as amended.

G. All excavations for building sewer installations shall be adequately guarded with barricades and lights, so as to protect the public from hazard. Streets, sideways, sidewalks and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the CITY or other appropriate governmental agencies. All necessary permits to the opening of streets shall be obtained from the Director of Public works in advance of the issuance of any Sewer Permit.

H. Building sewers shall be serviced and repaired by the owner of the property being served. Evidence of willful damage to building sewers shall be a violation of his ORDINANCE.

SECTION 4 CONNECTION WITH JOINT SEWER

A. Connections of building sewers shall, wherever possible, be made to CITY sewers and not to Joint Meeting main lines or trunk sewers. No direct connection nor alteration or repair of any such connection with the Joint Sewer shall be made without having first obtained a written permit from the Joint Meeting and from the CITY.

B. Each permit to connect with the Joint Sewer, if and when issued, will require that the applicant for such permit agrees that it or he will carefully make the connection with the Joint Sewer in the manner prescribed by the Joint Meeting; that it or he will defend, indemnify and save harmless the Joint Meeting and the CITY from all accidents and damages caused by any negligence in protecting his work or any imperfect or inadequate work done by virtue of such permit; that it or he will faithfully comply with the ordinances of the CITY and that he will replace and restore the sidewalk, pavement or street surface over any opening he may have made, the work to be subject to the inspection and approval of the Joint Meeting and the CITY.

C. Connections with the Joint Sewer shall be made only by a plumber licensed and/or recognized by the CITY or by some other person duly authorized by the Joint Meeting and the CITY. Connections shall be made with suitable aterials approved by the Joint Meeting. All work included in the construction of connections with the Joint Sewer or relating thereto shall be done to the satisfaction of the Joint Meeting and the CITY, and the person or persons doing said work shall accept as final all decisions of the Joint Meeting and the CITY as to the fitness of all aterials furnished or work done and shall immediately replace all work ejected.

D. Connections shall be such as to provide flexibility and water tight joints. A manhole shall be provided if required. Connections shall include a cast iron hub set and sealed in the main sewer. No connections shall be covered until inspected by the Joint Meeting and the CITY. No top connections will be permitted.

SECTION 5 USE OF PUBLIC SEWERS

A. No person shall discharge, or cause to be discharged any storm water, surface water, ground water, roof runoff, sub-surface drainage, cooling water or other unpolluted waters to any sanitary sewer.

B. Storm water and all other unpolluted drainage shall be discharged to such storm sewers or combined sewers specifically designated or to a natural outlet approved by the Engineer. Industrial cooling water or unpolluted process water may be discharged upon approval by the Engineer to a public or private storm sewer or a natural outlet.

C. So far as is practicable, industrial wastes may be discharged into the CITY's Sewer System, with or without pretreatment, provided the consent of the Engineer is first obtained and the rules, regulations and standards hereinafter prescribed are complied with in the judgement of the Engineer.

Written approval by the Engineer is required for all new discharges of industrial wastes added to the CITY's Sewer System after the effective date of this Ordinance. These shall include all wastes in which the quantity, temperature, or chemical characteristics are altered in operation procedures and equipment changes.

D. No industry shall discharge any flow directly into a sanitary, combined, or storm sewer. All such discharge shall be through a manhole or other approved flow sampling structure to be located between the sidewalk and curb or other location agreed upon in writing between such industry and the Engineer and the Joint Meeting and to be built by the owner. Each manhole or approved sampling structure shall be kept safe and accessible at all times.

When required by the CITY, Joint Meeting, NJDEP, and/or USEPA, an industry shall install and maintain additional facilities at their own expense including, for example, meters, sealed automatic monitoring systems, or other appurtenances to facilitate observation, sampling and measurement of wastes. Construction, installation, and maintenance of such additional facilities shall be the responsibility of the industry which shall keep these facilities safe and accessible to the CITY and Joint Meeting at all times. Design and construction of such additional facilities shall be subject to the requirements of the governmental Authority requiring them.

E. No person shall discharge or cause to be discharged to any public sewer any of the following described substances, materials, waters, or wastes.

(a) Any liquid or vapor having a temperature higher than one hundred-fifty degrees Fahrenheit (sixty-five degrees Centigrade) except by written approval by the Engineer. In such cases, the Engineer may require installation, by the industry, of an approved temperature recorder in the receiving sewer.

(b) Any water or wastes which contains grease or oil or other substance that will solidify or become discernibly viscous at temperatures under one hundred-fifty degrees Fahrenheit.

(c) Any water or wastes containing mineral oil and grease exceeding on analysis an average of one-hundred parts per million (eight-hundred thirty-four pounds per million gallons) or any floating oil without written approval of the Engineer.

(d) Any gasoline, benzene, naptha, fuel oil, or other flammable or explosive liquid, solid or gas.

(e) Any water or wastes that contain more than two parts per million by weight of the following gases: hydrogen sulphide, sulphur dioxide, or oxides of nitrogen.

(f) Any ashes, cinders, sand, mud, straw, shavings, metal, glass, rubber, rags, feathers, tar, fleshings, entrails, lime slurry, lime residues, beer or distillery slops, chemical residues, paint residues, cannery waste bulk solids, or any solid or viscous substance capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewage works.

(g) Any water or wastes that contain phenols in such quantity that the aggregate of contributions throughout the area of service creates treatment difficulties, or produces a plant effluent which may be unsatisfactory.

(h) Any water or wastes, acids or alkaline in reaction and having corrosive properties, capable of causing damage or hazard to structures, equipment or personnel of the sewage works. Free acids and alkalis of such wastes must be neutralized, at all times, within a permissible range of pH between 5.0 and 9.0.

(i) Any waters or wastes containing a toxic or poisonous substance in toxic amounts as defined by USEPA regulations or in sufficient quantity to damage the sewage works, injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, or create any hazard in the receiving waters or the wet weather overflows of the effluent of the sewage treatment plant, or result in a violation of effluent limitations or other conditions contained in any NPDES permit.

(j) Heavy metals in excess of the following concentrations:

Iron as FE	5 parts per million
Chromium as Cr	1 part per million
Nickel as Ni	1 part per million
Copper as Cu	1 part per million
Cadmium as Cd	0.1 part per million
Zinc as Zn	2.5 parts per million

At no time, shall the hourly concentration exceed three times the average concentration, and with contributions from individual establishments subject to control in volume and concentration by the Engineer.

(k) Cyanide (CN), or any of its compounds amenable to chlorination in excess of 0.08 parts per million by weight as CN in the wastes from any outlet into the public sewers with a peak day concentration not exceeding 0.2 ppm. Total cyanide (CN) shall not exceed 0.5 mg/l at anytime.

(l) Any water or wastes containing the discharge of strong acid iron pickling wastes, or concentrated plating solutions whether neutralized or not.

(m) Any waters containing suspended solids of such character and quantity that unusual provision, attention, or expense is required to handle such materials at the sewage treatment plant.

(n) Any noxious or malodorous gas or substance, which either singly or by interaction with any waste, is capable of creating a public nuisance, hazard or menace to life or property or of preventing entry into sewers for their maintenance and repair.

(o) Any radioactive wastes or isotopes of such half-life or concentration that may exceed limits established by the CITY or Joint Meeting in compliance with applicable State or Federal regulations, without special permit.

(p) Any waters or wastes that for a duration of fifteen minutes have a concentration greater than five times that of "Normal" sewage as measured by suspended solids and BOD.

(q) Any concentrated dye wastes, spent tanning solutions, or other wastes which are highly colored, or wastes which are of unusual volume, concentration of solids or composition, as for example: (1) total suspended solids of inert nature (such as Fuller's Earth), and/or (2) total dissolved solids (such as sodium chloride, calcium chloride, or sodium sulphate) or (3) unusual in BOD.

(r) Any waters or wastes which, by interaction with other water or wastes in the public sewer system, release obnoxious gases or develop color of undesirable intensity, or form suspended solids in objectionable concentration; or create any other condition deleterious to structures and treatment processes.

(s) Any wastes discharged at a flow rate that is excessive over a relatively short period of time, which cause or may cause an upset of the treatment process and a substantial loss of treatment efficieny, or which may exceed the hydraulic capacity of the sanitary sewer system;

(t) Any garbage other than properly shredded garbage.

Section [illegible]

F. Notwithstanding the provisions of ~~Subdivision 74~~ any discharge into the public sewer of wastes, whose concentration of suspended solids, or BOD, or grease causes at the municipal sewage works a monthly increase in the average daily analysis of any of these constituents in excess of two percent of the annual daily average for the previous year, is prohibited unless specifically approved by the CITY and the Joint Meeting.

G. Grease, oil and sand interceptors shall be provided when, in the opinion of the Plumbing Inspector, they are necessary for the proper

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handling of liquid wastes containing grease in excessive amounts or any inflammable wastes, sand and other harmful ingredients, except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of the type and capacity as approved by the Plumbing Inspector, and shall be so located as to be readily and easily accessible for cleaning and inspection. Grease and oil interceptors shall be constructed of impervious materials capable of withstanding abrupt and extreme changes in temperature. They shall be of substantial construction and as approved by the Plumbing Inspector, watertight and equipped with removable covers which, when mounted in place, shall be gas tight and watertight.

H. All grease, oil and sand interceptors shall be maintained by the owner at his expense in continuous, efficient operation at all times.

I. The admission into the public sewers of any waters or wastes having the following characteristics:

(a) A BOD of more than two hundred-forty parts per million

(b) A suspended solids content greater than three hundred parts per million

(c) A quantity of substances having the characteristics described in Subdivision 74 except as defined in (a) and (b) above

(d) An average flow greater than ten thousand gallons per day shall be prohibited unless reviewed and approved by the Engineer.

Where necessary, in the opinion of the Engineer, the owner shall provide, at his expense, such pretreatment as may be necessary to:

(a) Reduce the BOD to two hundred-forty parts per million and the suspended solids to three hundred parts per million

(b) Reduce objectionable characteristics or constituents to within the maximum limits which are provided for in Subdivision 74

(c) Control the quantities and rates of such discharge of waters and wastes

Plans, specifications and any other pertinent information related to the proposed pretreatment facilities shall be submitted for approval of the Engineer.

No construction of such facilities shall be commenced until said approvals are obtained in writing.

When pretreatment standards are adopted by NJDEP or USEPA or any given class of industries, then any industry within that class shall conform to the NJDEP or USEPA timetable for adherence to pretreatment requirements as well as all other applicable requirements promulgated by the NJDEP or USEPA in accordance with the provisions of law. Additionally, such industries shall comply with such more stringent standards necessitated by local conditions as determined from time to time by the CITY and the Joint Meeting.

J. Where pretreatment facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner, at his expense, and shall be subject to the periodic inspection by the Engineer. They shall be the type and capacity approved by the Engineer and must produce an effluent conforming to the provisions of this ORDINANCE. The owner shall maintain operating records and shall submit to the Engineer a monthly summary report of the character of the influent and effluent as may be prescribed by the Engineer to show satisfactory performance of the treatment facilities.

K. Any approval of the Engineer of a type, kind or capacity of an installation shall not relieve the owner of the responsibility of revamping, enlarging or otherwise modifying an installation if it is found inadequate to accomplish the intended purpose.

L. All measures, tests and analyses of the characteristics of waters and wastes to which reference is made herein, shall be determined in accordance with "Standard Methods for the Examination of Water and Sewage" and shall be determined at a control manhole or other approved sampling structure provided for herein upon suitable samples taken at said control manhole or other approved sampling structure. In the event that no manhole or other approved sampling structure has been required, the control manhole or other approved sampling structure shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected.

M. No statement contained in this Article shall be construed as preventing any special agreement or arrangement between the CITY and any industrial user whereby an industrial waste of unusual strength or character may be accepted by the CITY for treatment subject to extra payment therefor by the industrial concern.

N. Without having first obtained the signed, written permission of the CITY and the Joint Meeting, no person shall directly or indirectly discharge or cause to be discharged any quantity of waste or wastewater to any public sewer or natural outlet from a non-stationary source, including for example, but not limited to, the discharge of industrial waste from any tank truck. Each and every individual operator and/or owner of a non-stationary source that discharges in violation of this Section shall be subject to the penalties prescribed.

SECTION 6 PROTECTION FROM DAMAGE

No unauthorized person shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface or temper with any structure, appurtenance or equipment which is a part of the public sewage works. Any person violating these provisions shall be subject to immediate arrest under charges of disorderly conduct.

SECTION 7 POWER AND AUTHORITY OF INSPECTORS

The Engineer and other duly authorized officers and employees of the CITY, the Joint Meeting, the NJDEP and USEPA bearing proper credentials and identification shall be permitted immediately upon all private and public property for the purpose of inspection, observation, measurement, sampling and testing in accordance with the provisions of this ORDINANCE during any reasonable hour of the day or at any time during an emergency.

SECTION 8 SUBMISSION OF INFORMATION

All persons discharging sewage or wastes to the sewage works shall be required to provide information to the CITY, Joint Meeting, NJDEP or USEPA, as needed, to determine compliance with this ordinance. This information may include:

a. Wastewater discharge rate and volume over a specified time period;

b. Chemical analysis of wastewater;

c. Information on raw materials, processes, and products affecting wastewater volume and quality;

d. Quantity and disposition of specified liquid, sludge, oil, solvent, or other materials important to sewer use control;

e. A plot plan of sewers on the user's property showing sewer and pretreatment facility location;

f. Details of wastewater pretreatment facilities;

g. Details of systems designed to prevent and/or control the loss of spilled materials to the sanitary sewer (i.e. spill prevention plan).

h. Any other information required by the City or Joint Meeting.

When persons responding to such a requirement furnish proprietory information of a confidential nature, they shall so stipulate and their proprietory information shall be treated as such and not disclosed as general knowledge.

SECTION 9 PENALTIES

Any person violating any provision of this ORDINANCE shall be guilty of an offense, and any person guilty of such violation may be liable to a fine which shall not exceed five-hundred dollars ($500) in amount, or to imprisonment not exceeding ninety days, or to both such fine and imprisonment. Each day in which any violation of any provision of this ORDINANCE shall continue may be deemed a separate violation.

SECTION 10 RECOVERY OF COSTS

Any person violating any provision of this ORDINANCE shall become liable to the CITY and the Joint Meeting for any expense, loss or damage sustained or incurred by the CITY and the Joint Meeting by reason of such violation.

SECTION 11 VALIDITY

A. The invalidity of any section, clause, sentence or provision of this ORDINANCE shall not affect the validity of any other part of this ORDINANCE which can be given effect without such invalid part or parts.

B. Nothing herein shall be deemed to relieve any person of duty and esponsibility of complying with the Plumbing Code of the CITY asamended.

SECTION 12 EFFECTIVE DATE

A. The effective date of this Ordinance shall be at the time and in the manner provided by law.

B. Upon the effective date of this ordinance, a copy thereof properly certified by the City Clerk shall be filed in the Office of the Register of Union County and snall be deemed notice to all owners of real estate serviced by the City of Elizabeth of their liability for sewerage service supplied.

PASSED: MAR 28 1978

JOSEPH E. McGLYNN
President of City Council

APPROVED: 3/29/78

Thomas G. Dunn

THOMAS G. DUNN
MAYOR

ATTEST:

John J. Dwyer, City Clerk

MAR 29 1978

3/18/78

4/4/1978

John J. Dwyer

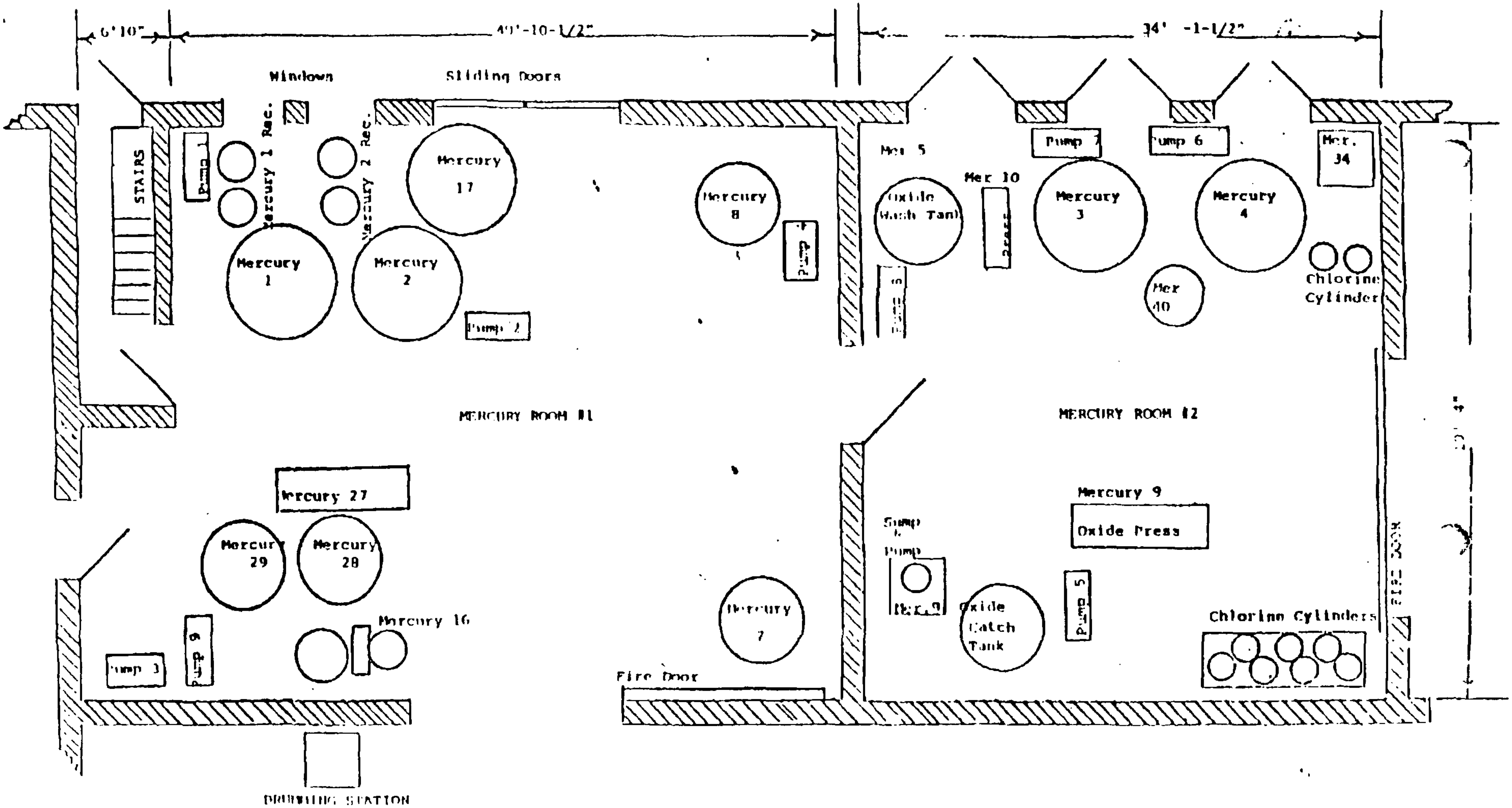
APPENDIX D

CLOSURE COST ESTIMATE

PREMISES AND JUSTIFICATION

APPENDIX E

MERCURY PROCESSING AREA -
EXPANDED FLOOR PLAN
AND EQUIPMENT INVENTORY



SEE ATTACHED LEGEND

Mercury Production Area
Plan View - First Floor   Scale: Sketch
Tenneco, Elizabeth, N. J.
Date: May 6, [illegible]   Drawn By: John [illegible]

959270211

TENNECO CHEMICALS, INC.
COATINGS AND COLORANTS

LEGEND:

MERCURY ROOM #1

Mercury Reactor #1:	2000 gallon glass-lined Pfaudler Jacket Steam heat and jacket water cooled.
Mercury Reactor #2:	2000 gallon glass-lined Pfaudler used specifically for washing benzene and pH adjustment of effluent.
Mercury 17:	2000 gallon 316 stainless steel storage tank for mercury products.
Mercury 28 & 29:	Benzene recovery tanks 316 stainless steel - 1000 gallon capacity.
Mercury 27:	Acetic acid recovery tank-316 stainless steel - 800 gallon capacity.
Mercury 16:	Buffalo Filter Press - 316 stainless steel with 100 gallon precoat tank with attached pump. Pump is a Goulds Model 3199, size: 1x1-1/2 x6.
Mercury 8:	Caustic tank 500 gallon capacity fiber glass (30% Caustic solution)
Mercury 7:	1 Mercury Metal Recovery Tank with agitator-1000 gallon 316 Stainless Steel
Pump #1	Goulds Model 3196-Size: 1x2-6 Imp 5.87 5 H.P. 3600 R.P.M. 50 G.P.M.-140' Head. Used to pump out M-1 and M-2 receivers.
Pump #2	Mercury 17 storage tank pump. Viking size-1-1/2" - 2 H.P. 1750 R.P.M. Approx. 10 G.P.M.
Pump #3	Recovered Benzene and Acetic Acid Pump used to pump from recovery tanks back to M-1 or M-2. Pump type: Goulds Model 3196, Size: 1x2-6 5 H.P.-3600 R.P.M. IMP. 5.87 50 G.P.M. 140' Head.
Pump #4	Mercury Recovery Scrubber Pump-Goulds Model 3196, Size: 1x2-6 Imp. Size 4.31 5 H.P. 3600 R.P.M. 60 G.P.M.-140' Head
Pump #9	1" Viking pump 2 H.P. Capacity 10 G.P.M. Pump used to transfer liquids to sump in Mercury Room 2.

[illegible], INC.

[illegible]

LEGEND:

MERCURY ROOM #2

Mercury Reactor #3:	Same as Mercury 1 and 2. Used to treat all mercury effluent pumped in from Mercury 9 sump.
Mercury Reactor #4:	Same as Mercury 1, 2 & 3. Use exclusively for chlorination of mercury metal and producing mercuric oxide.
Mercury #9:	Sump for all mercury effluent. Sump capacity 100 gallons. Sump pump type: Galigher - Size 1-1/2" S.S. Model D-1.5 SS A-400 x 41" - Ser-EP64-2215-23 H.P. at 1800 R.P.M. Max. Head 40' - maximum G. P.M. 100
Pump #5	Oxide Recovery Filter Pump. Make: Duriron 1-1/2" x 1" Model H7UE60 - Ser. 65064 5 H.P. 3600 R.P.M.
Pump #6	Oxide Circulating Pump: Make Durco Mark II Chlorumet #3 5 H.P. 1750 R.P.M. Size 1-1/2 x 1-6 IMP Size-6" 40 G.P.M. 32' Head.
Pump #7	Effluent treatment M-3 filter pump. Make: Goulds Mod-3196 Size 1x2-6 5 H.P. 3600 R.P.M. IMP Size 5.87 60 G.P.M.-140' Head.
Pump #8	Oxide Transfer Pump - Make: Durco pump Durimet 20 Mod. WHB-1-080 Pump Size 1x1-1/2 IMP Size 8" 10 H.P. 1750 R.P.M.
Mercury 40	Mercury Pot with BFI metering pump.
Mercury 10	Horizontal leaf filter press for mercury effluent. Filtering area-60 square feet.
Mercury #5	Fiber glass oxide wash tank 1000 gallon capacity - open top.
Mercury #6	500 gallon oxide wash catch tank. Fiber glass open top.
Mercury #9	24" rubber lined plate and frame oxixe filter press for Mercury #6.
Mercury #34	Hot water vaporizer tank for liquid chlorine.

APPENDIX X

RESULTS OF PREVIOUS

SAMPLING AND ANALYSIS

Copies of soil testing results are included under Appendix VII-1.

There has been no surface water sampling here. Most of the effluent monitoring was done as a result of grab and 24 hour composite sampling by the Joint Meeting Sewer Authority. In most cases, the sample was split and we sent half to an outside testing laboratory. The Joint Meeting did not always send us copies of their results. Wherever we have both Joint Meeting and outside Lab results on a sample, they are attached.

Copies of the effluent monitoring done in our Lab is also included. There is an automatic sample hooked into our discharge sump. Samples are taken every 2 hours. A weekly composite is taken and analyzed. The metals are analyzed by Atomic Absorption Spectrophotometry.

United States Testing Company, Inc.

Environmental Sciences Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

03816
NUMBER
June 15, 1978

CLIENT: Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, N. J. 07201

SUBJECT: One sample submitted and identified by the Client as: Composite collected 5/15/78 for Essex-Union J C Meeting parameters for pH, Turbidity, Solids (Total, Suspended, Volatile Suspended), Chlorides, O/G, O/G Emulsified, COD, As, Cd, Cu, Cr, Total, Cr (UI), Hg, Ni, Pb, Va, Zn, Co, Mn, Zirconium, Ba, Fe.

Project:

Chemical analyses of the submitted samples.

Procedure:

The analyses were performed in accordance with the current United States Environmental Protection Agency procedural requirements for National Pollution Discharge Elimination Permits as specified by the Environmental Protection Agency, unless modifications or alterations of the specific procedures are indicated. The procedures can be found in the following specified references.

1) Methods for Chemical Analysis of Water and Wastes, 1974 Environmental Protection Agency, Analytical Quality Control, Cincinnati, Ohio.

2) Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 14th Edition, 1975.

3) Annual Book of Standards, part 31, Water, 1976 American Society of Testing & Materials.

SIGNED FOR THE COMPANY

BY David A. Shulman

David I. Shulman

:.Rider/br

UNITED STATES TESTING COMPANY, INC.

REPORT OF WATER AND WASTEWATER ANALYSIS

Client: Tenneco Chemicals Report No.: 03816 Date: 6/14/78

Sample No.: 1 Description Composite collected 5/15/78 for EUJM parameters.

Sample No.: Description

TEST	SAMPLE NO. 1		TEST	SAMPLE NO. 1	
...ity (as $CaCO_3$)			Surfactants		
...nity, Total (as $CaCO_3$)			Aluminum		
...kalinity			Antimony		
Hydroxide			Arsenic	<0.01	
...arbonate			Beryllium		
Bicarbonate			Cadmium	0.09	
...omides			Calcium		
...Organic Carbon			Chromium, Total	<0.02	
...ical Oxygen Demand (COD)	210		Chromium, Hexavalent	<0.1	
...lorides	180		Cobalt	0.15	
...ne Residual			Copper	0.10	
...nated Hydrocarbons			Iron	0.40	
...anides			Lead	0.58	
...des			Magnesium		
...ess, Total			Manganese	0.18	
...ide			Mercury	<0.0002	
...en			Molybdenum		
...mmonia			Nickel	0.09	
Nitrate			Potassium		
Nitrite			Selenium		
...hl			Sodium		
.../Grease Floatable	<5.0		Tin		
... (Units)	11.0		Titanium		
...ls			Zinc	0.15	
...osphate, Total			Immediate Oxygen Demand		
...ica, Dissolved			Biochemical Oxygen Demand (5 days)		
...li			Biochemical Oxygen Demand (20 days)		
...otal	616		Coliform, Total (MPN/100 mls.)		
Suspended	48		Coliform, Fecal (MPN/100 mls.)		
...olatile	140		Fecal Streptococcus (MPN/100 mls.)		
...otal Dissolved			Total Plate Count (per ml.)		
Volatile Suspended	48		Odor (Units)		
...ettleable Solids			Color (Units)		
...s			Specific Conductance (micromhos/cm.)		
...lfides			Taste (Units)		
...lfites			Turbidity (N.T.U.)	15	
...i Grease-Emulsified	<5.0		Barium	10.0	
...otal Mineral Solids	476		Vanadium	<0.2	
...ineral Suspended Solids	0		Zirconium	<10.0	

REMARKS: Note: " < " - Concentration is below indicated EPA Method detection capability. All values in units of mg/l, unless otherwise noted.

Note: All Results are given in mg./l. unless otherwise shown.

959270217

Cable Address "NYTESLA" NEW YORK

Lab. No.

75-47664

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L.I., N.Y. 11590 • P.O. BOX 484 • (212) 297-1449 • (516) 334-7770

REPORT OF TESTS

October 27, 1975

Lab. No. & Client — 75-47664 - Tenneco Chemicals Inc.

Material — Two (2) Water Samples

Client's Order No. — 152420

Identification — 10-1-75

Submitted for — Chemical Analysis

We find as follows:	East	West
Cadmium, mg/1	1.182	1.932
Mercury, mg/1	0.026	0.011

Certification

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz, Chief Officer

To:
Tenneco Chemicals Incorporated
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Att: Mr. Voelker
eo

Report on sample by client applies only to sample. Report on samples by us applies only to lot sampled.
Information contained herein is not to be used for reproduction except by special permission.
Samples retained for thirty days maximum after date of report unless specifically requested otherwise by client.
The liability of the New York Testing Laboratories, Inc. with respect to the services charged for herein shall in no event exceed the amount of the invoice.

FORM 100 2M

959270218

Townley RESEARCH AND CONSULTING

CHEMISTRY · MICROBIOLOGY
RELATED SCIENCES

470 LONG HILL ROAD, GILLETTE, N. J. 07933 · (201) 647-1137

October 3, 1974

Mr. J. Voelker
Tenneco Chemicals Inc.
Organics & Polymers Div.
830 Magnolia Avenue
Elizabeth, N.J. -7201

P.O. 69233

Wastewater Analysis

Dear Mr. Voelker:

Herewith our findings for the analysis of a wastewater sample (to sanitary sewer) in accordance with the requirements (partial) of the Industrial Waste Survey of the Joint Meeting, Irvington.

TRC No. 3256

(Figures generally in ppm.) Source: Waste discharge to Sanitary Sewer

pH		5.8
Total solids		369
	Volatile	142
	Mineral	227
Suspended solids		8
	Volatile	6
	Mineral	2
Oil & Grease	Floatable	0.0
	Emulsified	4.6
COD		178
BOD		123
Total organic carbon		52
Toxic substances		No inhibition to growth of E. coli bacteria at 1:1 dilution in lactose broth.

Very truly yours,

Gary J. Gilbert

Gary J. Gilbert

Cable Address "NYTESLA" NEW YORK

Lab. No.
74-44132 (H)

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N.Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

June 26, 1974

Lab. No. & Client — 74-44132 (H) - Tenneco Chemicals, Inc.

Material — Two (2) Water Samples

Client's Order No. — 53975, Rel. No. 10

Identification — East Sewer, West Sewer 6/6/74

Submitted for — Chemical Analysis

Reference

Standard Methods for the Examination of Water and Waste Water, 13th Edition 1971, American Public Health Association, New York, N. Y.

Results

	East Sewer	West Sewer
Cadmium, µg/liter	55	560
Mercury, µg/liter	0.2	0.6

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz
Chief Officer

TO:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N. J. 07201

Att: Mr. John Voelker
Q.C. Chief

cf

Cable Address "NYTESLA" NEW YORK

Lab. No.
74-44132 (G)

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N. Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

May 31, 1974

Lab. No. & Client	—	74-44132 (G) - Tenneco Chemicals, Inc.
Material	—	Two (2) Sewage Samples
Client's Order No.	—	Letter 5/2/74 -
Identification	—	East, West - 5/2/74
Submitted for	—	Chemical Analysis

Reference

Standard Methods for the Examination of Water and Waste Water, 13th Edition 1971, American Public Health Association, New York, N.Y.

Results

	East	West
Cadmium, mg/liter	2.50	0.020
Mercury, mg/liter	0.065	0.005

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz
Chief Officer

To:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N.J. 07201

Att: Mr. John Voelker, Q.C. Chief
ea

FORM 100 3M

Cable Address "NYTESLA" NEW YORK

Lab. No.
74-44132 (E)

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N.Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

March 25, 1974

Lab. No. & Client — 74-44132 (E) - Tenneco Chemicals, Inc.

Material — Two (2) Water Samples

Client's Order No. — 53975, Rel. No. 07

Identification — East Sewer, West Sewer 3/7/74

Submitted for — Cadmium and Mercury Determination in accordance with E.P.A. requirements

---

Reference

Standard Methods for the Examination of Water and Waste Water, 13th Edition 1971, American Public Health Association, New York, N. Y.

Results

	East Sewer	West Sewer
Cadmium, μg/liter	17	50
Mercury, μg/liter	0.6	24.6

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz
Chief Officer

To:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N.J. 07201
Att: Mr. John Voelker, Q.C. Chief
ea

Report on sample by client applies only to sample. Report on samples by us applies only to lot sampled.
Information contained herein is not to be used for reproduction except by special permission.
Samples retained for thirty days maximum after date of report unless specifically requested otherwise by client.
The liability of the New York Testing Laboratories, Inc. with respect to the services charged for herein shall in no event exceed the amount of the invoice.

Cable Address "NYTESLA" NEW YORK

Lab. No.
74-44132 (C)

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N.Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

February 28, 1974

Lab. No. & Client — 74-44132 (C) - Tenneco Chemicals, Inc.

Material — Two (2) Waste Water Samples

Client's Order No. — 53975, Rel. 05

Identification — East, West 2/7/74

Submitted for — Chemical Analysis in accordance with E.P.A. Requirements

---

Reference

Standard Methods for the Examination of Water and Waste Water, 13th Edition 1971, American Public Health Association, New York, N. Y.

Results

	Cadmium µg/liter	Mercury µg/liter
East Sewer 2/7/74	1190	111
West Sewer 2/7/74	568	48.5

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz
Chief Officer

To:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N.J. 07201

Att: Mr. John Voelker, Chief of Quality Control
ea

Cable Address "NYTESLA" NEW YORK

1-7-74 samples

Lab. No.
73-44132 A

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N.Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

January 21, 1974

Lab. No. & Client — 73-44132 A - Tenneco Chemicals, Inc.

Material — Two (2) Sewer Water Samples

Client's Order No. — 53975, Rel. 03

Identification — East, West 1/7/74

Submitted for — Chemical Analysis in accordance With E.P.A. Requirements

---

Reference

Standard Methods for the Examination of Water and Waste Water, 13th Edition 1971, American Public Health Association, New York, N. Y.

Results

	Cadmium mg/liter	Mercury mg/liter
East	0.187	0.022
West	0.023	0.010

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz
Chief Officer

To:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N.J. 07201
Att: Mr. John Voelker
Chief of Quality Control

ea

FORM 100 2M

Cable Address "NYTESLA" NEW YORK

Lab. No.
73-44064

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N.Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

December 17, 1973

Lab. No. & Client — 73-44064 - Tenneco Chemicals, Inc. Intermediates Div.

Material — Two (2) Waste Water Samples

Client's Order No. — 59298

Identification — East, West 12-4-73

Submitted for — Chemical Analysis

We find as follows:

RESULTS

	East	West
Cadmium, µg/l	2365	50
Mercury, µg/l	107	800

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horwitz
Chief Officer

To:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N. J. 07201
Att: Mr. John P. Voelker
Chief of Quality Control

gt:

Cable Address "NYTESLA" NEW YORK

Lab. No.
73-43913

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N.Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

November 13, 1973

Lab. No. & Client — 73-43913 - Tenneco Chemicals, Inc.

Material — Two (2) Water Samples

Client's Order No. — 58679

Identification — As below

Submitted for — Chemical Analysis

Reference:

Standard Methods for the Examination of Water and Waste Water, 13th Edition 1971, American Public Health Association, New York, N. Y.

Results:

	11/2/73 East Sewer Sample	11/2/73 West Sewer Sample
Cadmium, µg/liter	<4.5	9.0
Mercury, µg/liter	<0.07	0.07

< less than

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz
Chief Officer

To:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N. J. 07201

Att: Mr. John Yoelker
Chief of Quality Control

ea

Cable Address "NYTESLA" NEW YORK

Lab. No.
73-43798

NEW YORK TESTING LABORATORIES, INC.

81 URBAN AVENUE, WESTBURY, L. I., N.Y. 11590 • 516 EDgewood 4-7770

REPORT OF TESTS

October 17, 1973

Lab. No. & Client — 73-43798 - Tenneco Chemicals, Inc.

Material — Two (2) Water Samples

Client's Order No. — 56047

Identification — East, West 10/1/73

Submitted for — Chemical Analysis

Reference

Standard Methods for the Examination of Water and Waste Water, 13th Edition 1971, American Public Health Association, New York, N. Y.

Results

	East	West
Cadmium, µg/liter	350	46
Mercury, µg/liter	96	<1

< less than

We certify that this report is a true report of results obtained from our tests of this material.

Respectfully submitted,

NEW YORK TESTING LABORATORIES, INC.

G. J. Horvitz
Chief Officer

To:
Tenneco Chemicals, Inc.
Intermediates Division
830 Magnolia Avenue
Elizabeth, N. J. 07201

Att: Mr. John Voelker, Chief Qlty. Control

ea

FORM 100 3M

P[illegible]ity [illegible]lut[illegible] An[illegible]is
Summarization of Findings

	Catch Basin 5/12	Catch Basin 5/13	Catch Basin 5/14	Laboratory Sump 5/12	Laboratory Sump 5/13	Laboratory Sump 5/14	Criteria Level For Evaluation	Standard
pH				13.1	13.2	13.1	6-9	Joint Meeting Sewer Use Ordinance
oil/grease mg/l		271	180		149	279	100 mg/l	"
barium mg/l			1.21			1.21	1.0 mg/l	Federal Drinking Water Standards
cadmium mg/l	1.486	0.568	0.50		0.05	0.02	0.01 mg/l	"
chromium mg/l	0.155	0.281	0.15	0.09	0.15	0.09	0.05 mg/l	"
copper mg/l		1.225	1.02		2.61	1.07	1.0 mg/l	Joint Meeting Sewer Use Ordinance
lead mg/l					8.92	3.69	2.0 mg/l	"
mercury mg/l				2.50			0.2 mg/l	"
nickel mg/l	4.36	2.27	5.49				2.0 mg/l	"
zinc mg/l	14.2	44.9			45.5	41.73	5.0 mg/l	"
benzene ppb				69700	2540	596	15 ppb	Water Quality Criteria
1,3-dichlorobenzene ppb	685	1960	1990	523	396	2170	230 ppb	"
1,2-dichlorobenzene ppb	417						230 ppb	"
2-chlorophenol ppb		11100	6250				60 ppb	"
phenol mg/l	268	778	853	.513	939		3.4 mg/l	"
2,4-dichlorophenol ppb	522	3110	1290		2970	109	.5 ppb	"
2,4,6-trichloro-phenol ppb	505	3970	1200				100 ppb	"
2,4-dinitrophenol ppb	76.7	1020	6000			1330	68.8 ppb	"
2-methyl-4,6-dinitrophenol ppb	193			268		246	68.8 ppb	"
4-nitrophenol ppb	385		52400			400	240 ppb	"

Table 2

Comparison of Tenneco Data and

Joint Meeting

	Priority Pollutant 5/12-5/14			Joint Meeting 9/8-9/12				Joint Meeting 10/20-10/24				Criteria Level For Evaluation	Standard
Cadmium mg/l	1.48	0.568	0.50	1.25	0.19	0.82	0.20	79.5	12.8	11.2	16.5	0.01 mg/l	Federal Drinking Water Standards
Copper mg/l	0.55	1.22	1.02	0.33	0.18	0.29	0.19	1.44	0.60	0.86	3.27	1.0 mg/l	Joint Meeting Sewer Use Ordinance
Nickel mg/l	4.36	2.27	5.49	0.10	ND	0.15	0.04	8.5	33.0	10.8	2.69	2.0 mg/l	"
Lead mg/l	1.40	0.86	0.97	2.15	0.77	0.65	0.10	4.7	1.1	1.6	8.75	2.0 mg/l	"
Zinc mg/l	44.9	14.2	0.04	32.0	0.71	10.0	0.98	50.5	21.8	48.0	48.5	5.0 mg/l	"
Mercury mg/l	0.01459	0.009	0.087	0.0390	0.0360	0.050	0.0250	0.1778	0.2380	0.1110	0.2052	0.2 mg/l	"
Mercury mg/l (Laboratory)	2.50	-	0.00049			0.2850		0.5116	2.3625	0.1675	0.2150	0.2 mg/l	"

ND - None detected

959270229

cc: Ron Neu

BCM Betz • Converse • Murdoch • Inc.

One Plymouth Meeting Mall • Plymouth Meeting, Pennsylvania 19462 • Telephone: 215 • 825-3800

.OR: Tenneco Chemicals, Inc.
830 Magnolia Ave.
Elizabeth, NJ 07201

DATE OF REPORT: 7/1/80
PAGE: 1 of

SAMPLES DATED: 5/12/80
RECEIVED: 5/12/80

.TTENTION: John Saraka

THE FOLLOWING REPORT COVERS THE LABORATORY EXAMINATION OF SAMPLES DELIVERED TO JR LABORATORIES. PLEASE DO NOT HESITATE TO CONTACT US SHOULD ANY QUESTIONS ARISE.

.ERY TRULY YOURS,

FJ Kernozek /SAW

Frank J. Kernozek, PhD.
ECTION MANAGER, LAB SERVICES

	001	002				
BOD_5, mg/l	510	2120				
COD, mg/l	1155	4820				
uspended Solids, mg/l	12	103				
pH	6.4	13.1				
ecal Coliform, No/100 mls	0	0				
Oil & Grease, mg/l	56	10				
Antimony as Sb, mg/l	<0.125	<0.125				
rsenic as As, mg/l	0.013	0.032				
Barium as Ba, mg/l						
admium as Cd, mg/l	1.486	0.016				
Total Chromium as Cr, mg/l	.155	.092				
Copper as Cu, mg/l	0.553	.088				
ead as Pb, mg/l	1.40	1.08				
Mercury as Hg, mg/l	0.01459					
continued-						

LAB 21

959270230

Converse • Murdoch • Inc

Tenneco Chemicals, Inc.

DATE OF REPORT: 7/1/80

SAMPLES DATED: 5/12/80
RECEIVED: 5/12/80

	001	002				
as Ni, mg/l	2.27	0.16				
enium as Se, mg/l	0.002	0.011				
ium as Tl, mg/l	<0.140	<0.140				
c as Zn, mg/l	14.2	0.24				
Method 601						
hod 602	see attached					
Method 604	see attached					

.THOD 602 all ppb	001	002				Detectic Limits ppb
·nzene	*	69700				2.0
Toluene	*	*				2.4
hyl benzene	141	*				2.4
Chlorobenzene	620	564				6.7
ı,4-Dichlorobenzene	200	*				41
3-Dichlorobenzene	685	523				51
1,2-Dichlorobenzene	417	*				73

*none detected

M HOH 604 all ppb	001	002				Limit ppb
2-Chlorophenol	*	*				0.3
[illegible]itrophenol	*	3.8				0.4
P[illegible]enol	268000	513				0.4
2,4-Dimethylphenol	*	*				0.5
2[illegible]-Dichlorophenol	522	*				0.7
2,4,6-Trichlorophenol	505	66.7				1.4
4[illegible]hloro-3-methylphenol	153	38.7				1.1
2[illegible]-Dinitrophenol	76.7	*				3.4
2-Methyl-4,6-dinitrophenol	193	268				1.6
P[illegible]tachlorophenol	*	*				4.5
4-Nitrophenol	385	*				9.9
			*none detected			

B. 2.3

959270233

BCM Betz • Converse • Murdoch • Inc.

One Plymouth Meeting Mall • Plymouth Meeting, Pennsylvania 19462 • Telephone: 215 • 825-3800

FOR: Tenneco Chemicals, Inc.
830 Magnolia Ave.
Elizabeth, NJ 07201

DATE OF REPORT: 7/1/80
PAGE: 1 of

SAMPLES DATED: 5/13/80
RECEIVED: 5/13/80

ATTENTION: John Saraka

THE FOLLOWING REPORT COVERS THE LABORATORY EXAMINATION OF SAMPLES DELIVERED TO OUR LABORATORIES. PLEASE DO NOT HESITATE TO CONTACT US SHOULD ANY QUESTIONS ARISE.

VERY TRULY YOURS,

FQ Kernozek /SAW

Frank J. Kernozek, PhD.
SECTION, MANAGER, LAB SERVICES

	001	002				
BOD_5, mg/l	1430	3700				
COD, mg/l	5240	12380				
Suspended Solids, mg/l	32	79				
pH	6.4	13.2				
Fecal Coliform, No/100 mls	0	0				
Oil & Grease, mg/l	271	149				
Antimony as Sb, mg/l	<0.125	<0.125				
Arsenic as As, mg/l	0.015	0.021				
Barium as Ba, mg/l						
Cadminm as Cd, mg/l	0.568	0.047				
Total Chromium as Cr, mg/l	0.281	0.155				
Copper as Cu, mg/l	1.225	2.61				
Lead as Pb, mg/l	0.86	8.92				
Mercury as Hg, mg/l	0.00092					
-continued-						

LAB 21

Tenneco Chemicals, Inc.

DATE OF REPORT: 7/1/80
PAGE: 2 of

SAMPLES DATED: 5/13/80
RECEIVED: 5/13/80

	001	002				
ckel as Ni, mg/l	4.36	<0.10				
lenium as Se, mg/l	0.009	0.004				
r as Ag, mg/l	<0.020	0.043				
allium as Tl, mg/l	<0.140	<0.140				
as Zn, mg/l	44.9	45.5				
Method 601						
Method 602	see attached					
hod 604	see attached					

HCD 602 all ppb	001	002				Detection Limits ppb
Benzene	*	2540				2.0
Toluene	*	139				2.4
Ethyl benzene	2000	38.4				2.4
Chlorobenzene	2050	171				6.7
1[illegible]-Dichlorobenzene	*	*				41
1,[illegible]-Dichlorobenzene	1960	396				51
1,2-Dichlorobenzene	104	*				73
			*none detected			

959270236

METHOD 604 all ppb	001	002				Detect Limit ppb
2-Chlorophenol	11100	*				0.3
2-Nitrophenol	*	*				0.4
Phenol	778000	939000				0.4
2,4-Dimethylphenol	*	*				0.5
2,4-Dichlorophenol	3110	2970				0.7
2,4,6-Trichlorophenol	3970	*				1.4
4-Chloro-3-methylphenol	*	188000				1.1
2,4-Dinitrophenol	1020	*				3.4
2-Methyl-4,6-dinitrophenol	*	*				1.6
Pentachlorophenol	*	*				4.5
4-Nitrophenol	*	*				9.9

*none detected

cc: Ron Neu

BCM Betz • Converse • Murdoch • Inc.

One Plymouth Meeting Mall • Plymouth Meeting, Pennsylvania 19462 • Telephone: 215 • 825-3800

.OR: Tenneco Chemicals, Inc.
830 Magnolia Ave.
Elizabeth, NJ 07201

DATE OF REPORT: 7/1/80
PAGE: 1 of

SAMPLES DATED: 5/14/80
RECEIVED: 5/14/80

.TTENTION: John Saraka

THE FOLLOWING REPORT COVERS THE LABORATORY EXAMINATION OF SAMPLES DELIVERED TO JR LABORATORIES. PLEASE DO NOT HESITATE TO CONTACT US SHOULD ANY QUESTIONS ARISE.

.ERY TRULY YOURS,

F J Kernozek /SAN

Frank J. Kernozek, PhD.
SECTION, MANAGER, LAB SERVICES

	001	002				
BOD$_5$, mg/l	1713	1897				
COD, mg/l	3465	3265				
Suspended Solids, mg/l	28	58				
pH	7.2	13.1				
ecal Coliform, No/100 mls	0	0				
Oil & Grease, mg/l	180	279				
Antimony as Sb, mg/l	<0.125	<0.125				
rsenic as As, mg/l	0.020	0.026				
Barium as Ba, mg/l	1.21	1.21				
admium as Cd, mg/l	0.50	0.02				
Total Chromium as Cr, mg/l	0.15	0.09				
Copper as Cu, mg/l	1.02	1.07				
ead as Pb, mg/l	0.97	3.69				
Mercury as Hg, mg/l	0.087	0.00049				
continued-						

LAB 21

959270238

Converse • Murdoch • Inc.

Tenneco Chemicals, Inc.

DATE OF REPORT: 7/1/80

SAMPLES DATED: 5/14/80
RECEIVED: 5/14/80

	001	002				
:kel as Ni, mg/l	5.49	<0.10				
ium as Se, mg/l	0.004	0.004				
r as Ag, mg/l	< 0.020	< 0.020				
llium as Tl, mg/l	< 0.14	< 0.14				
as Zn, mg/l	0.04	41.73				
Method 601	see attached					
Method 602	see attached					
:hod 604						

TYQU.601 all ppb	001					Limits ppb
loromethane	*					0.0009
methane	*					0.03
chlorodifluoromethane	*					0.03
nyl chloride	*					0.01
l oethane	*					0.01
thylene chloride	0.336					0.01
i..lorofluoromethane	*					0.01
1' ichloroethene	*					0.006
1-Dichloroethane	*					0.004
a -1,2-Dichloroethene	*					0.006
loroform	3.41					0.006
2-Dichloroethane	*					0.006
1 -Trichloroethane	*					0.005
rbon tetrachloride	1.54					0.007
dichloromethane	*					0.006
ichloropropane	*					0.004
ans-1,3-Dichloropropene	*					0.006
i..loroethene	7.57					0.005
mochloromethane	*					0.01
1,2-Trichloroethane	*					0.006
s ,3-Dichloropropene	*					0.006
Chloroethylvinyl ether	*					0.06
omoform	*					0.02
1 ,2-Tetrachloroethane , and/or	0.328		*none detected			0.006
trachloroethene						0.007
lt. obenzene	*					0.03
ichlorobenzene	*					0.04
-Dichlorobenzene	*					0.04
ichlorobenzene	*					0.04

..00 602 all ppb	..01	002				Detection Limits ppb
..ene	*	596				2.0
..luene	300	*				2.4
..l benzene	*	4.5				2.4
..lorobenzene	1160	26.7				6.7
.. Dichlorobenzene	*	*				41
.. Dichlorobenzene	1990	2170				51
..2-Dichlorobenzene	*	*				73

*none detected

JOINT MEETING
MAINTENANCE
IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

October 3, 1980

Tenneco Chemicals Inc.
830 Magnolia Avenue
Elizabeth, N.J. 07201
Attn: Mr. Robert Lareau

Dear Mr. Lareau:

Pursuant to your request, the following is our laboratory analysis of a composite sample of your plant effluent taken on each of the dates shown below.

The results are in milligrams per liter, unless otherwise noted. ND means "not detected".

	1 Day	30 Day	9/8-9/9	9/9-9/10	9/10-9/11	9/11-9/12
Total Organic Carbon	NO LIMIT		234	70	355	423
Biochemical Oxygen Demand	NO LIMIT		594	156	708	909
Total Suspended Solids	NO LIMIT		44	24	37	26
Total Cadmium	0.40	.20	1.25	0.19	0.82	0.20
Total Chromium	3.0	1.0	0.05	<0.01 ND	<0.01 ND	0.05
Total Copper	1.0	.5	0.33	0.18	0.29	0.19
Total Nickel	2.0	1.0	0.10	ND	0.15	0.04
Total Lead	2.0	1.0	2.15	0.77	0.65	0.10
Total Zinc	5.0	2.5	32.0	0.71	10.0	0.98
Total Mercury	.2	.1	0.0390	0.0360	0.0500	0.0250
Total Mercury (Laboratory Area Only)				0.2850		

Since some of the heavy metals data exceed the limitations of our Sewer Use Ordinance, I would like to set up an extended sampling program to verify our test results. Our field inspectors will contact you in this regard within the next few weeks.

If you have any questions or require further information regarding this matter, please do not hesitate to contact us.

959270242

Thank you for your cooperation with our sampling team.

Very truly yours,

Allen S. Fornwald
Chief Officer
Industrial Surveillance and
Pretreatment

ASF:jj

JOINT MEETING
MAINTENANCE
IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

800 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

November 4, 1980

Tenneco Chemicals, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Robert Lareau
Works Manager

Dear Mr. Lareau:

The following are our Laboratory Analyses of composite samples of your plant effluent taken on the dates indicated. All sampling equipment was acid washed prior to use. One milliliter of nitric acid was added to each sample bottle to "fix" the metals. The discrete samples were composited for analysis. The composites were comprised of 95% from the tank area pit and 5% from the laboratory area. The samples were digested in accordance with the procedures specified in the 14th edition of "Standard Methods for the Examination of Water and Wastewater". Atomic absorption spectrophotometry was used as the method of analysis. The results, in mg/l, were as follows:

	2nd		3rd				1st
	Cd	Cr	Cu	Ni	Pb	Zn	Hg
10/20 - 10/21							
Composite	79.5	0.10	1.44	8.5	4.7	50.5	0.1778
Lab Area	*						0.5116
10/21 - 10/22							
Composite	12.8	0.08	0.60	33.0	1.1	21.8	0.2380
Lab Area	*						2.3625
10/22 - 10/23							
Composite	11.2	0.07	0.86	10.8	1.6	48.0	0.1110
Lab Area	*						0.1675
10/23 - 10/24							
Composite	16.5	0.09	3.27	2.69	8.75	48.5	0.2052
Lab Area	*						0.2150

*Lab Area tested for mercury only

RECEIVED

959270244

Since our sampling and analytical procedures were in strict accordance with U. S. Environmental Protection Agency and Standard Methods procedures, I consider our test results to be valid.

Our analysis show that your plant effluent exceeds the limitations of the Elizabeth Sewer Use Ordinance and the Joint Meeting Sewer Use Ordinance for Cadmium, Copper, Nickel, Lead, Zinc and Mercury. I have enclosed a tabulation of these limitations for your information.

Our records also show that your plant is one of the ten greatest industrial contributors to the Joint Meeting of Cadmium, Lead, Zinc and Mercury.

Please be advised that this letter serves as formal notice that your plant effluent is in violation of the Ordinances listed and that this violations must be corrected immediately.

The Joint Meeting prefers that industry comply with its limitations on a voluntary basis.

We will be pleased to work with you in this regard. If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Allen S. Fornwald

Allen S. Fornwald
Chief Officer Industrial
Surveillance & Pretreatment

ASF:aa
Enclosure

cc:George J. Minish, Esq.
Victor Vinegra, City Engineer

D: 4/3/81
JS

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

March 23, 1981

Tenneco Chemicals, Inc.
830 Magnolia Avenue
Elizabeth, N.J. 07201
Attn: Mr. John Saraka

Dear Sir:

Pursuant to your request, the following are our Laboratory analyses of composite samples of your plant effluent taken on the dates indicated. The results are in mg/l unless otherwise noted.

	Mercury Treatment Area - March 2-3,1981	Tank Area March 3-4,1981
pH Standard Units	11.4	6.7
Temperature °C	15	6
Total Organic Carbon	1960	296
Biochemical Oxygen Demand	3896	812
Total Suspended Solids	262	6
Total Cadmium	0.10	*
Total Chromium	0.14	*
Total Copper	0.67	*
Total Nickel	0.24	*
Total Lead	1.93	*
Total Zinc	0.46	*
Total Mercury	3.180	0.075

* Not Tested.

Your plant continues to be in violation of the City's and the Joint Meeting's Limitations for pH and mercury. The limitations for these parameters are:

pH 6.0 - 9.0 Mercury - 0.2 mg/l (one day maximum)

959270246

In November, 1980, I advised Mr. Lareau of the high levels of several metals, including mercury, in your plant effluent. He informed me that a program was being initiated to reduce these effluent metal concentrations. Our most recent data suggest that progress has been made in this endeavor. However, I am concerned about the continuing levels of mercury in your effluent.

Please advise me of the steps you are currently taking to reduce your effluent mercury concentration and the timetable for the Reduction to occur.

If you require any further information regarding this matter, please do not hesitate to contact me.

Very truly yours,

Allen S. Fornwald
Chief Officer
Industrial Surveillance
and Pretreatment

ASF:jj
cc: George Minish, Esq.
Victor Vinegra, City Eng.

Joint Meeting

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

April 16, 1981

Mr. John Saraka
Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Dear Mr. Saraka:

The analyses of your 2 samples received March 23, 1981 have been completed. The results are presented in the attached tables.

All determinations were performed in accordance with Standard Methods, 14th Edition (1975). If there are any questions, please feel free to contact me.

Very truly yours,

PRINCETON AQUA SCIENCE

John Cirello, Ph.D., P.E.
Vice President

JC/mjs
Enclosure
#5253e

cc: Andrea S. Walters
Tenneco/Accounts Payable

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

Company Tenneco Chemicals
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. John Saraka

Job #: 5253e
Date: 4/16/81
Auth.: P.O.# 78962
Lot #: 228
Invoice #: 5787
Sample Date: 3/23/81

REPORT OF ANALYSIS

	West Discharge Port 3/3/81 (mg/l)	East Discharge Port 3/4/81 (mg/l)
pH (unit)	6.7	12.5
TOC	280	1800
BOD	360	3060
TSS	112	16
Cadmium	0.320	0.062
Chromium	0.080	0.080
Copper	0.100	0.580
Nickel	21.6	0.130
Lead	0.039	0.382
Zinc	7.70	1.75
Mercury	<0.005	<0.005

F U
11/16/81

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

October 26, 1981

Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. John Saraka

Dear Mr. Saraka,

The following are our laboratory analyses for two composite samples of your plant effluent taken on September 2-3, 1981.

The results are expressed as milligrams per liter unless otherwise noted:

	TANK AREA		MERCURY TREATMENT AREA	
Total Cadmium	3.50	5.0	3.19	[illegible]
Total Chromium	<0.01	0.050	<0.01	[illegible]
Total Copper	0.36		0.27	
Total Nickel	0.51		0.44	
Total Lead	12.0	52.0	10.0	[illegible]
Total Zinc	23.2		24.0	
Total Mercury	0.135	[illegible]	6.98	[illegible]
pH Standard Units	6.70	6.0	8.50	[illegible]
Temperature °C	25		25	

The above samples were composited for our annual Industrial User Charge Analysis. The composite sample contained 95% Tank Area: 5% Mercury Treatment Area. The results, expressed as milligrams per liter, are as follows:

Total Organic Carbon	992	1203
Biochemical Oxygen Demand	1924	[illegible]
Total Suspended Solids	53	[illegible]

959270250

The results show that your plant effluent continues to exceed the Joint Meeting Sewer Use Ordinance or Elizabeth Sewer Use Ordinance for Cadmium, Lead, Zinc and Mercury.

On April 7, 1981 you informed us that you had purchased a Manning automatic sampler and expected delivery in approximately six to eight weeks. What is the status on this sampler?

Please advise us of the steps in progress to reduce the Metals concentrations of your effluent.

Very truly yours,

Cathy L. Pullizzi

Cathy L. Pullizzi
Industrial Surveillance & Pretreatment

CLP:jeo

cc: George Minish, Esq.
Victor Vinegra
City Engineer

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

September 30, 1981

Mr. James J. Harrigan
Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Dear Mr. Harrigan:

The analyses of your 2 samples received September 3, 1981 have been completed. The results are presented in the attached tables.

All determinations were performed in accordance with Standard Methods, 15 Edition (1980). If there are any questions, please feel free to contact me.

Very truly yours,

PRINCETON AQUA SCIENCE

Thomas Leonard for/JOHN CIRELLO

John Cirello, Ph.D., P.E.
Vice President

JC/mjs
Enclosure
#5253e

cc: Andrea S. Walters
Tenneco/Accounts Payable

rec'd 10/7/81

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

Company Tenneco Chemicals
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: James J. Harrigan

Job #: 5253e
Date: 9/30/81
Auth.: 93184
Lot #: 575
Invoice #: 5110
Sample Date: 9/3/81

REPORT OF ANALYSIS

	Lab Sewer (mg/l)	Catch Tank (mg/l)
pH (unit)	10.9	6.0
TOC	2,400	1,140
TSS	130	30
Arsenic	<0.001	0.009
Barium	0.167	1.12
Cadmium	0.025	5.06
Chromium	0.077	0.090
Lead	11.9	52.0
Mercury	<0.0002	<0.0002
Selenium	0.222	0.242
Silver	<0.006	<0.006
BOD	3,690	960

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

800 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

April 22, 1982

RECEIVED
APR 26 1982

Tenneco Chemicals, Inc.
880 Magnolia Avenue
Elizabeth, New Jersey 07206

Attention: Mr. B. Cole

Dear Mr. Cole:

The following are our laboratory analyses of composite samples taken at your facility on the dates indicated. The results are expressed as milligrams per liter unless otherwise indicated. NA means not analyzed.

Sample Date	2/23 - 2/24/82		3/8 - 3/9/82	
Sample Location	Lab	Tank	Lab	Tank
pH Standard Units-Grab	11.2	NA	10.2	6.0
pH Standard Units - Comp.	5.6	5.3	6.4	5.3
Biochemical Oxygen Demand	6752	843	7768	320
Total Organic Carbon	3400	820	4298	513
Total Suspend Solids	330	16	55	17
Total Cadmium	0.06	1.98	0.01	1.28
Total Chromium	0.05	0.01	0.01	0.03
Total Copper	0.33	16.0	0.20	1.28
Total Nickel	0.31	1.17	0.07	0.45
Total Lead	12.5	1.28	29.0	3.13
Total Zinc	0.25	8.77	0.44	4.57
Total Mercury	NA	NA	0.12	1.03

The data indicates that your plant effluent continues to exceed the limitations of the City of Elizabeth's Ordinance and/or the Joint Meeting's Ordinance for pH, Cadmium, Copper, Nickel, Lead, Zinc, and Mercury. I have enclosed a table of these ordinance limitations for your information.

As per our telephone conversation of this morning we are hereby requesting that Tenneco submit a monthly status report, beginning this month, to include any plans or progress made toward pretreatment, and any data generated by our laboratory analyses.

If you have any questions or require any further information, please do not hesitate to contact us.

Thank you in advance for your cooperation.

Very truly yours,

Cathy L. Pullizzi

Cathy L. Pullizzi
Industrial Surveillance
& Pretreatment

CLP:aa
Enclosure

cc:George J. Minish, Esq.
Mr. Victor Vinegra, City Engineer

EFFECTIVE MAY 18, 1981

LIMITATIONS ON HEAVY METALS

	Elizabeth Ordinance 1313 Mg/l	Joint Meeting Ordinance Mg/l 1-day max	30-day max
Cadmium	0.1	0.4	0.2
Chromium (total)	1	3	1
Copper	1	1	0.5
Nickel	1	2	1
Lead	1	2	1
Zinc	2.5	5	2.5
Mercury	0.5	0.2	0.1

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

March 31, 1982

Mr. J. Saraka
Tenneco Chemicals, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Dear Mr. Saraka:

Analysis of the two wastewater samples received March 10, 1982 has been completed. The results are presented in the attached table.

The determinations were performed in accordance with Standard Methods 15th Edition (1980).

If you have any questions please feel free to contact me.

Very truly yours,

PRINCETON AQUA SCIENCE

Thomas Simei
for/ JOHN CIRELLO

John Cirello, Ph.D., P.E.
Vice President

JC/mjs
Enclosure
#5253e

cc: Andrea S. Walters
Accounts Payable

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

Company Tenneco Chemicals, Inc.
Address 830 Magnolia Ave.
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. J. Saraka

Job #: 5253e
Date: 3/31/82
Auth.:
Lot #:
Invoice #: 5675
Sample Date: 3/10/82

REPORT OF ANALYSIS

	Sample A Tank Farm (mg/l)	Sample B Lab & Mercury - Treatment (mg/l)
pH (unit)	6.3	6.9
TOC	400	6,000
BOD	586	12,800
Total Suspended Solids	24	18
Oil & Grease	48	32
Phenols (Total)	0.779	0.285
COD	1,300	18,000
Surfactants	0.072	0.072
Chromium	<0.013	<0.013
Cadmium	1.69	0.025
Copper	1.79	0.111
Zinc	5.07	0.54
Nickel	0.364	0.029
Lead	3.06	5.57
Mercury	0.063	<0.0002

JOINT MEETING
MAINTENANCE
IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

May 21, 1982

Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian Cole

Dear Mr. Cole:

The following are our laboratory analyses of two samples of your plant effuent taken on May 5, 1982. The results are expressed as milligrams per liter.

RECEIVED
MAY 24 1982

	Tank Area	Lab Area
Total Cadmium	40.0	0.03
Total Chromium	0.58	0.01
Total Copper	480.	0.66
Total Nickel	44.8	0.08
Total Lead	675.	12.0
Total Zinc	310.	0.33
Oil and Grease	21,592	123

The results indicate that Tenneco is in gross violation of the Joint Meeting Regulations and the City's Sewer Use Ordinance for Cadmium, Copper, Nickel, Lead, Zinc, and Oil and Grease.

The Metal and Oil and Grease concentrations present are intolerable. Mr. Victor Vinegra, City Engineer, has been notified of these findings.

We will contact you shortly to arrange a meeting with representatives of the City's Engineering Department and the Joint Meeting to discuss this matter.

If you have any questions regarding this matter, please do not hesitate to contact us.

Very truly yours,

Allen S. Fornwald

Allen S. Fornwald
Chief Officer, Industrial
Surveillance & Pretreatment

ASF:aa

cc:Victor Vinegra, City Engineer

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

June 14, 1982

Mr. James J. Harrigan
Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Dear Mr. Harrigan:

The analyses of your 2 samples received May 5, 1982 have been completed. The results are presented in the attached tables.

All determinations were performed in accordance with Standard Methods, 15th Edition (1980). If there are any questions, please feel free to contact me.

Very truly yours,

PRINCETON AQUA SCIENCE

Daniel Chen

Daniel Chen, P.E.
Laboratory Manager

DC/mjs
Enclosure
#5253e

cc: Dr. Roy T. Gottesman
Tenneco/Accounts Payable

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

Company: Tenneco Chemicals
Address: 830 Magnolia Avenue
City: Elizabeth State: NJ Zip: 07201
To Attn. of: James J. Harrigan

Job #: 5253e
Date: 6/11/82
Auth.: 100767
Lot #: 1194
Invoice #: 5910
Sample Date: 5/5/82

REPORT OF ANALYSIS

	Tank Farm (mg/l)	Laboratory (mg/l)
pH (unit)	6.7	10.5
Oil and Grease	17,100	19.6
TSS	17,900	180
Copper	304	0.868
Nickel	23.9	0.049
Cadmium	26.8	0.025
Chromium	1.21	0.038
Lead	1,180	10.8
Mercury	2.74	0.004
Zinc	99.8	0.204
BOD	18,450	420

Consulting Environmental Scientists & Engineers

Well Water
Sample

PRINCETON AQUA SCIENCE

WATER ANALYSIS DATA SHEET

Company Tennessee eliz.

Address

City State Zip

To Attn. of:

Job # 5253 e
Date
Auth. PO# 87597
Lot # 300
Invoice
Sample Date: 5/1/81

IDENTIFICATION

Parameters Milligrams/liter

D Stds		4/30/81		2° Stds		4/30/81
		well water				well water
As		<0.003		Surfactants		
Ba		0.50		Chloride		140
Cd		0.0027		Cu		0.0091
Hex Cr		<0.002		Hardness		370
				Fe		0.274
Pb		<0.010		Mn		0.342
Se		<0.0007		Phenols		
		<0.0005		Na		41.7
NO3-N		<0.023		SO4		
CN		<0.0003		TDS		
Endrin		[illegible]0 ppb		Zn		0.075
Lindane		<1.0 ppb				
Methoxychlor		<1.0 ppb				
Toxaphene		<1.0 ppb				
2,4 D		<1.0 "				
2,4,5 TP		<1.0 "				

959270262

PAS

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

April 6, 1981

Mr. Brian Cole
Plant Manager
Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Dear Mr. Cole:

The analyses of your 3 samples received March 27, 1981 has been completed. The results are presented in the attached tables.

All determinations were performed in accordance with Standard Methods, 14th Edition (1975) and Federal Register, December 3, 1979. If there are any questions, please feel free to contact me.

Very truly yours,

PRINCETON AQUA SCIENCE

John Cirello, Ph.D., P.E.
Vice President

JC/mjs
Enclosure
#5253e

cc: Andrea S. Walters
Tenneco/Accounts Payable

RECEIVED
APR 1 1981

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

Company Tenneco Chemicals
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. Brian Cole

Job #: 5253e
Date: 3/6/81
Auth.:
Lot #: 232
Invoice #: 5778
Sample Date: 3/23/81

REPORT OF ANALYSIS

	#1 Organic Layer Sump of Compressor Pit	#2 Organic Layer Taken Off Floor	#3 Organic Layer Wall of Cat Room Pit
		(mg/kg wet)	
Cadmium	4,720	9,150	350
Barium	302	4,520	<3.0
Zinc	2,200	4,990	210
Mercury	925	1,380	925
Phosphorus	2,700	26,700	234
Iron	-	-	57,100
Manganese	-	-	137
Benzene	<80	<80	<80
Phenol	3,410	5,870	4,160
% Mineral Spirits (as petroleum distillate quantified as mineral spirits)	-	-	6.93

Consulting Environmental Scientists & Engineers

959270264

① Composite Sample Wee" of 10/18/81

Organic → 2.22 %
PH of Aq. → 6.5

Cu Air / CH ≡ CH   Ba NO_2 / CH ≡ CH
Cd " "
Pb " "
Hg " "
Zn " "

Suspended solids - 425 PPM T.K.

Effluent sample

nm 324.75 Cu - 1.30 ppm (0.2) T.K. (nm 553.55) Ba - 43.8 ppm (0.5 slit)
nm 217.00 Pb - 7.20 ppm (0.5)
nm 213.86 Zn - 684 ppm (0.5)
nm 253.65 Hg - 0.18 ppm (0.5)
nm 228.80 Cd - 19.4 ppm (0.5)

② Composite Sample Week of 10/25/81

Organic → 3.45% J.S.
PH of Aq → 6.8 J.S.
Suspended Solids - 442 PPM J.S.

slit		Air / CH ≡ CH	slit	NO_2 / CH ≡ CH
0.2	nm 324.75	Cu — 2.48 ppm	(0.5)	nm 553.55 Ba — 21.70 ppm
0.5	nm 217.00	Pb — 14.20 ppm		
0.5	nm 213.86	Zn — 505 ppm		
0.5	nm 253.65	Hg — 0.06 ppm		
0.5	nm 228.80	Cd — 11.30		

JS

959270265

③ Composite Sample week of 11/2/81

% Organics 1.14 %
Suspended Solids — 1895 ppm
PH 6.0

Air / $CH \equiv CH$

Cu ⟶ 3.0 ppm
Pb ⟶ 7.6 ppm
Zn ⟶ 110 ppm
Hg ⟶ 0.05 ppm
Cd ⟶ 1.5 ppm

NO_2 / $CH \equiv CH$

Bz ⟶ 18.0 ppm

④ Composite Sample week of 11/9/81

% Organic's 3.2 %
Suspended Solids — 297 ppm
PH 5.8

Air / $CH \equiv CH$

Cu ⟶ 180 ppm
Pb ⟶ 9.0 ppm
Zn ⟶ 85 ppm
Hg ⟶ 0.02 ppm
Cd ⟶ 0.5 ppm

NO_2 / $CH \equiv CH$

Bz ⟶ 15.0 ppm

⑤ Aq. Sample taken from R.R tracks/Plant

PH ⟶ 6.8
Suspended Solids ⟶ 325 ppm

Air / $CH \equiv CH$)

Cu ⟶ 5.0 ppm
Pb ⟶ 11.0 ppm
Zn ⟶ 75 ppm
Hg ⟶ 4.0 ppm
Cd ⟶ 10. ppm

NO_2 / $CH \equiv CH$

Bz ⟶ 25.0 ppm

Com
⑥
%
Sus
Pl
Air
Cu –
Pb –
Zn –
Hg
Cd

Ai

Cu
Pb
Zn
Hg
Cd

⑦ Com
%
Susp

A

Cu
Pb
Zn
Hg
Cd

11/?/81

(6) Composite Sample week of 1/16/81

% Organic 2.70
Suspended Solids 119 PPM
PH 6.4

Air/CH≡CH — Cu → 840 ppm; Pb → 4.0 ppm; Zn → 18.0 ppm; Hg → 0.000 ppm; Cd → 0.40 ppm

N_2O/CH≡CH — Ba → 16.4 ppm

The above Leachate (Clean (Nalls))

Air/(CH≡CH) — Cu → 0.010 ppm; Pb → 0.00 ppm; Zn → 0.00 ppm; Hg → 0.00 ppm; Cd → 0.00 ppm

N_2O/CH≡CH — Ba → 0.3 ppm

(7) Composite Sample week of 11/22/81

% Organic 2.15%
Suspended solids 103 ppm
PH 6.3

Air/CH≡CH — Cu → 12 ppm; Pb → 5.5 ppm; Zn → 3.2 ppm; Hg → 0.00 ppm; Cd → 2.2 ppm

N_2O/CH≡CH — Ba → 21.4 ppm

18.0 ppm

→ 25.0 ppm

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(8) Composite Sample week of 11/[illegible]/81

% organics ⟶ 2.15 %
suspended Solids ⟶ 270 ppm
PH ⟶ 6.0

Cu ⟶ 6.40 ppm
Pb ⟶ 1.80 ppm
Zn ⟶ 2.75 ppm
Hg ⟶ 0.00 ppm
Cd ⟶ 0.2 ppm

Ba ⟶ 1.80 ppm

Air / $CH \equiv CH$ NO_2 / $CH \equiv CH$

(9) Composite Sample week of 12/7/81

% organics ⟶ 0.0 %
Suspended solids ⟶ 180 ppm
PH ⟶ 6.6

Air / $CH \equiv CH$ NO_2 / $CH \equiv CH$

Cu ⟶ 1.80 ppm
Pb ⟶ 1.20 ppm
Zn ⟶ 0.80 ppm
Hg ⟶ 0.00 ppm
Cd ⟶ 0.10 ppm

Ba ⟶ 2.75 ppm

(10) Composite Sample week of 12/14/81

% organics ⟶ 0.5 %
Suspended Solids ⟶ 140 ppm
PH ⟶ 6.8

Air / $CH \equiv CH$ NO_2 / $CH \equiv CH$

Cu ⟶ 1.2 ppm
Pb ⟶ 0.8 ppm
Zn ⟶ 0.3 ppm
Hg ⟶ 0.0
Cd ⟶ 0.04

Ba ⟶ 0.7 ppm

(11) Plat...

(12) Comp...
Susp...
% Orga...
PH ⟶
Air /
Cu —
Pb —
Zn —
Hg —
Cd

(13) Composi...

Suspe...
% Orga...
PH —

Air /
Cu —
Pb —
Zn
Hg
Cd
M...
check
Meng...
(Ammon...
M...

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of = 12/30/81

ppm

? → 1.80 ppm

/o₂/CH≡CH

6 12/7/81

NO₂/CH≡CH → 2.75ppm

1/4/81

b₂/CH≡CH → 0.7ppm

(11) Plant Shut down weeks of 12/21/81 + 12/28/81

(12) Composite Sample week of 1/4/82

Suspended Solids → 240 ppm

% Organic → 1.40 %

PH → 6.4

Air/CH≡CH

Cu → 10.20 ppm

Pb → 1.30 ppm

Zn → 7.60 ppm

Hg → 0.00 ppm

Cd → 0.01 ppm

NO_2/CH≡CH

Bz → 2.40 ppm

(13) Composite Sample week beginning 1/11/82

Suspended Solids → 320 ppm

% Organic's → 1.75 %

PH → 6.5

Air/CH≡CH

Cu → 4.25 ppm

Pb → 13.15 ppm

Zn → 10.70 ppm

Hg → 0.00 ppm

Cd → 0.02 ppm

NO_2/CH≡CH

Bz → 1.10 ppm

Mangenese + Zirconium Present Positive check

Mangenese/permanganate → red violet color (Ammonium persulfate + $HgNO_3$)

Morin → greenish translucent Positive Zirconium

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(14) Composite sample of week beginning 1/18/82
Suspended Solids ⟶ 13 ppm
% Organic ⟶ Nil
PH ⟶ 4.8

Air/CH≡CH

Cu ⟶ 1.55 ppm
Pb ⟶ 17.60 ppm
Zn ⟶ 11.40 ppm
Hg ⟶ 0.00 ppm
Cd ⟶ 0.40 ppm

NO_2/CH≡CH

Ba ⟶ 6.40 ppm

(15) Composite Sample of week beginning 1/25/82
Suspended Solids ⟶ 520 ppm
% Organic ⟶ 1.7%
PH ⟶ 5.7

Air/CH≡CH

Cu ⟶ 12.85 ppm
Pb ⟶ 28.60 ppm
Zn ⟶ 10.35 ppm
Hg ⟶ 0.00 ppm
Cd ⟶ 0.15 ppm

NO_2/CH≡CH

Ba ⟶ 17.90 ppm

(16) Composite Sample of week beginning 2/1/82

Suspended Solids ⟶ 640 ppm
% Organic ⟶ 2.3%
PH ⟶ 5.9

Air/CH≡CH ppm

Cu ⟶ 14.20
Pb ⟶ 21.70
Zn ⟶ 9.40
Hg ⟶ 0.00
Cd ⟶ 0.10

NO_2/CH≡CH

Ba ⟶ 22.40 ppm

nings 1/18/82

NO_2/CH≡CH

→ 6.40 ppm

nings 1/25/82

/CH≡CH

→ 17.90 ppm

nings 2/1/82

" "

2/CH≡CH

→ 22.40 ppm

(17) Composite Sample of week beginning 2/8/82

Suspended Solids → 1300 ppm
% Organic → 3.2
PH → 6.4

Air/CH≡CH
Cu → 47.80 ppm
Pb → 24.30 "
Zn → 38.70 "
Hg → 0.00
Cd → 0.05

NO_2/CH≡CH
Bz → 5.60 ppm

(18) Composite Sample of week beginning 2/15/82
Suspended Solids → 740 ppm
% Organic → 2.1
PH → 6.0

Air/CH≡CH
Cu → 69.70 ppm
Pb → 11.45 ppm
Zn → 52.30 ppm
Hg → 0.00 ppm
Cd → 0.02 ppm

NO_2/CH=CH
Bz → 4.35 ppm

Joint Meeting 2/24/82

(20) Main Sewer
PH 6.4
Suspended Solids - 0 ppm

Cu → 0.85 ppm
Pb → 1.12 ppm
Zn → 0.40 ppm
Hg → 0.00 ppm
Cd → 0.08 ppm
Bz → 0.06 ppm

West tank Farm Sewer
PH - 5.0
Suspended solids 2790 ppm

Cu → 12.85
Pb → 148.15
Zn → 79.60
Hg → 0.03
Cd → 0.00
Bz → 1.15

8

(21) Composite sample from week beginning [illegible]

Suspended Solids [illegible] ppm
% Organic 1.6
PH 5.6

Air/CH_2 [illegible] — Cu → 12.75 ppm; Pb → 8.19 "; Zn → [illegible] "; Hg → [illegible] "; Cd → [illegible] "

N_2O/CH_2 [illegible] — Ba → 1.7[illegible] ppm

(22) Composite sample from week beginning [illegible]

Suspended Solids [illegible] ppm
% Organic [illegible]
PH [illegible]

Air/CH_2 [illegible] — Cu → [illegible] ppm; Pb → [illegible] ppm; Zn → [illegible] ppm; Hg → [illegible]; Cd → 0.01 ppm

[illegible] — Ba → [illegible] ppm

(23) Boiler Room effluent sample 24 hr discharge taken by Joint Meeting 5/7/[illegible] Sample A
PH 5.3

% Cu 2.24 ppm

% Ba 1.87 ppm

% Zn 5.76 ppm

% Pb 6.11 ppm

% Cd 0.01 ppm

% Hg 0.00 ppm

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ing 2/22/82

ECH
→ 1.25 ppm

ing 3/1/82

CH≡CH
→ 2.37 ppm

discharge
Sample A

.01 ppm

(24) Effluent discharge out side laboratory.
PH 6.7 Sample B

% Cu 0.46 ppm

% Zn 0.83 ppm

% Pb 4.96 ppm

% Cd 0.017 ppm

% Hg 0.00 ppm

% Ba 5.62 ppm

(25) Composite Sample from week beginning 3/8/82

PH → 5.2
Suspended Solids — 136 ppm
% Organic — 2.8

Air/CH ≡ CH
Cu → $\boxed{141.75 \text{ ppm}}$
Pb → 8.14 ppm
Zn → 6.71 ppm
Hg → 0.00 ppm
Cd → 0.03 ppm

NO_2/CH ≡ CH
Ba → 4.26 ppm

Organic from steel tank shows 0.71% Cu
" " Fiber tank " 0.52% Cu

Steel tank content Acid No. of 38
Fiber tank content (overflowed) Acid No. of 58

Note: Friday 3/12/82 Plant on thrid shift boiled over a copper batch + discharged accidently 629 gallons of 2-Ethylhexnoic Acid with approx 175 gallons of Mineral spirits

(A) Composite sample from week beginning [illegible]

pH → [illegible]
Suspended Solids = [illegible] ppm
% Organic [illegible]

As [illegible] ppm
Cu = [illegible] — Ba = [illegible]
Pb = [illegible]
Zn = [illegible]
Hg = [illegible]
Cd = [illegible]

(B) Composite sample [illegible]

pH = [illegible]
Suspended Solids [illegible] ppm
% Organic [illegible]

As [illegible]
Cu = [illegible] — Ba = [illegible]
Pb = [illegible]
Zn = [illegible]
Hg = [illegible]
Cd = [illegible]

[illegible]

(C) Composite sample [illegible]

pH = [illegible]
Suspended Solids [illegible]
% Organic [illegible]

As [illegible]
Cu = [illegible] ppm
Pb = [illegible] ppm — Ba = [illegible]
Zn = [illegible] ppm
Hg = [illegible] ppm
Cd = [illegible] ppm

3/15/82

H≡CH
41.15

nning 3/22/82

H≡CH
2.28 ppm

0.59 ppm

nning 3/29/82

/CH≡CH

1.42 ppm

(29) Composite Sample from week beginning 4/5/82

PH → 57
Suspended Solids → 383 ppm
% Organic → 0.4 %

Air/CH≡CH — NO_2/CH≡CH

Cu → 4.21 ppm — Ba → 1.73 ppm
Pb → 2.36 ppm
Zn → 1.09 ppm
Hg → 0.00 ppm
Cd → 0.04 ppm.

(30) Composite Sample from week beginning 4/12/82
PH - 6.1
Suspended Solids → 562 ppm
% Organic 0.65 %

Air/CH≡CH — NO_2/CH≡CH

Cu → 6.37 ppm — Ba → 2.91 ppm
Pb → 3.81 ppm
Zn → 2.47 ppm
Hg → 0.00 ppm
Cd → 0.07 ppm

(31) Composite Sample from week beginning 4/19/82

PH — 4.5
Suspended Solids — 60 ppm
% Organic Nil
Air/CH≡CH — NO_2/CH≡CH
Cu → 3.17 ppm — Ba → 3.11 ppm
Pb → 1.92 ppm
Zn → 1.79 ppm
Hg → 0.03 ppm
Cd → 0.09 ppm

(32) Composite Sample [illegible] [illegible]

S. Solids → [illegible] ppm

PH → [illegible]

Organic → [illegible] %

Air [illegible] Air [illegible]

Cu → [illegible] ppm [illegible] → [illegible]

Pb → [illegible] ppm

Zn → [illegible] ppm

Hg → [illegible] ppm

Cd → [illegible] ppm

(33) Composite Sample [illegible] [illegible]

Suspended Solids → [illegible] ppm

PH → [illegible]

Organic → [illegible]

Air [illegible] Air [illegible]

Cu → [illegible] ppm [illegible] → [illegible]

Pb → [illegible] ppm

Zn → [illegible] ppm

Hg → [illegible] ppm

Cd → [illegible] ppm

(34) Composite Sample [illegible] [illegible]

[illegible]

Suspended Solids [illegible] ppm

PH → [illegible]

Organic [illegible]

Air [illegible] Air [illegible]

Cu → [illegible] ppm [illegible] → [illegible]

Pb → [illegible] ppm

Zn → [illegible] ppm

Hg → 0.01 ppm

Cd → 0.1[illegible] ppm

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ınning 4/26/82

NO_2/CH≡CH
→ 1.42 ppm

beginning 5/3/82

H≡CH
→ 2.92 ppm

beginning 5/10/82

/CH≡CH
→ 3.07 ppm

(35) Composite Sample from week beginning 5/17/82

Suspended Solids 477 ppm
PH 7.3
Organic 1.2 %

Air/CH≡CH
Cu → 41.92 ppm
Pb → 13.64 ppm
Zn → 8.22 ppm
Hg → 0.01 ppm
Cd → 0.14 ppm

NO_2/CH≡CH
Bz → 4.17 ppm

(36) Composite Sample from week beginning 5/24/82

Suspended Solids 505 ppm
PH – 6.7
Organic 2.1 %

Air/CH≡CH
Cu → 9.17 ppm
Pb → 3.62 ppm
Zn → 2.84 ppm
Hg → 0.00 ppm
Cd → 0.11 ppm

NO_2/CH≡CH
Bz → 3.74 ppm

(37) Composite Sample from week beginning 5/31/82

Suspended Solids: 114 ppm Organic: ~~1~~.1
PH → 6.2

Air/CH≡CH
Cu → 2.37 ppm
Pb → 4.06 ppm
Zn → 1.81 ppm
Hg → 0.00
Cd → 0.22

NO_2/CH≡CH
Bz → 0.84 ppm

14

(38) Composite Sample from week beginning 6/1/82

PH → 6.6
Suspended Solids 21 ppm
Organic — trace

$Air/CH \equiv CH$		$No_2/CH \equiv CH$	
Cu	→ 0.63 ppm	Bz	→ 1.74 ppm
Pb	→ 1.81 ppm		
Zn	→ 1.01 ppm		
Hg	→ 0.01 ppm		
Cd	→ 0.11 ppm		

(39) Composite Sample from week beginning 6/14/82

PH → 6.8
Suspended Solids → 77 ppm
Organic — Trace

$Air/CH \equiv CH$		$No_2/CH \equiv CH$	
Cu	→ 0.92 ppm	Bz	→ 1.15 ppm
Pb	→ 1.37 ppm		
Zn	→ 1.83 ppm		
Hg	→ 0.01 ppm		
Cd	→ 0.14 ppm		

(40) Composite Sample from week beginning 6/21/82

PH → 6.2
Suspended Solids → 92 ppm
Organic - Trace

$Air/CH \equiv CH$		$No_2/CH \equiv CH$	
Cu	→ 1.47 ppm	Bz	→ 1.63 ppm
Pb	→ 3.92 ppm		
Zn	→ 2.06 ppm		
Hg	→ 0.03 ppm		
Cd	→ 0.08 ppm		

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ginning 6/7/82

/CHECH

→ 1.74 ppm

k beginning
6/14/82

/CH≡CH

→ 1.15 ppm

ginning 6/21/82

N_2O / CH≡CH
→ 1.63 ppm

(41) Composite Sample from week beginning 6/28/82

PH → 7.2
Suspended Solids → 29 ppm

Air / CH≡CH

Cu → 1.04 ppm
Pb → 0.96 ppm
Zn → 2.71 ppm
Hg → 0.01 ppm
Cd → 0.01 ppm

Be → 0.47 ppm

(42) Composite Sample from week beginning 7/5/82

PH → 6.9
Suspended Solids 87 ppm

Air / CH≡CH

Cu → 3.15 ppm
Pb → 0.47 ppm
Zn → 1.03 ppm
Hg → 0.07 ppm
Cd → 0.02 ppm

N_2O / CH≡CH

Bz → 1.12 ppm

(43) Composite Sample from week beginning 7/12/82

PH → 6.6
Suspended Solids → 127 ppm

Air / CH≡CH

Cu → 1.14 ppm
Pb → 0.89 ppm
Zn → 0.74 ppm
Hg → 0.09 ppm
Cd → 0.06 ppm

N_2O / CH≡CH

Bz → 0.77 ppm

(41) Composite Sample from week beginning 1/11/82

PH → 5.5

Suspended Solids → 117 ppm

Air / CH = CH   NO₂ / CH = CH

Cu → 2.71 ppm   Ba → 1.94 ppm

Pb → 1.46 ppm

Zn → 0.67 ppm

Hg → 0.09 ppm

Cd → 0.03 ppm

(45) Composite Sample from week beginning 1/24/82

PH → 6.6

Suspended Solids → 143 ppm

Air / CH = CH   [illegible]

Cu → 10.1 ppm   Ba → [illegible] ppm

Pb → 4.03 ppm

Zn → 0.61 ppm

Hg → 0.04 ppm

Cd → 0.01 ppm

(46) Composite Sample from week beginning 1/31/82

Suspended Solids → 410 ppm

PH → 6.2

Air / CH = CH.   [illegible]

Cu → 10.4 ppm   Ba → 1.06 ppm

Pb → 1.74

Zn → 0.87

Hg → 0.00

Cd → 0.06

ginning 7/19/82

= CN

→ 1.94 ppm

inirs 7/26/82

ν = CN

→ 2.47 ppm

ginning 8/2/82

, ICH = CH

→ 1.06 ppm

(47) mposite Sample from wee beginins 8/9/82

Suspended Solid → 276 ppm
PH → 6.1

Cu → 8.67 ppm Bz → 1.17 ppm
Pb → 0.92 ppm
Zn → 0.63 ppm
Hg → 0.06 ppm
Cd → 0.08 ppm

(48) Composite Sample from week beginins 8/16/82

Suspended Solids → 84 ppm
PH → 6.4
Cu → 2.79 ppm Bz → 0.63 ppm
Pb → 0.47 "
Zn → 0.71 "
Hg → 0.03 ppm
Cd → 0.08 ppm

(49) Composite Sample from week beginning 8/23/82

Suspended Solids → 63 ppm
PH → 7.6

Cu → 3.16 ppm Bz → 1.74 ppm
Pb → 1.04 ppm
Zn → 0.92 ppm
Hg → 0.02 ppm
Cd → 0.05 ppm

Vacation week of 8/30/82

(5[illegible]) Composite Samples from week beginning [illegible]

Suspended Solids = 1[illegible] ppm

pH → [illegible]

Cu → [illegible] ppm   Fe = [illegible] ppm

Pb → 0.[illegible] ppm

Zn → 1.6[illegible] ppm

Hg → 0.0[illegible] ppm

Cd → 0.0[illegible] ppm

([illegible]) Composite Sample from week beginning [illegible]

Suspended Solids = [illegible] ppm

pH → [illegible]

Cu → [illegible] ppm   Fe = [illegible] ppm

Pb → [illegible] ppm

Zn → [illegible] ppm

Hg → [illegible] ppm

Cd → [illegible] ppm

([illegible]) Composite Sample from week beginning [illegible]

Suspended Solids = [illegible] ppm

pH → [illegible]

Cu → [illegible] ppm   Fe = [illegible] ppm

Pb → [illegible] ppm

Zn → [illegible] ppm

Hg → [illegible] ppm

Cd → [illegible] ppm

([illegible])

Composite Sample from week beginning [illegible]

Suspended Solids = 1.5[illegible] ppm

pH → 6.7

Cu → 1.27 ppm   Fe = [illegible].38 ppm

Pb → 0.61 ppm

Zn → 0.49 ppm

Hg → 0.03 ppm

Cd → 0.02 ppm

beginning 9/6/82

→ 2.17 ppm

ning 9/13/82

→ 0.73 ppm

beginning 9/20/82

→ 0.47 ppm

beginning 9/27/82

→ 0.58 ppm

(54)

Composite from week beginning 10/4/82

Suspended Solids → 246 ppm

PH → 7.2

Cu → 3.61 ppm

Ba → 0.97 ppm

Pb → 1.18 ppm

Zn → 2.47 ppm

Hg → 0.05 ppm

Cd → 0.07 ppm

Samples from beginning wk	PH	PPM Solids	PPM Cu	PPM Pb	PPM Zn	PPM Hg	PPM Cd	PPM Ba	Remarks
10/11/82	6.7	274	1.75	0.41	1.27	0.01	0.07	1.43	
10/18/82	7.4	149	1.06	0.36	4.08	0.01	0.03	1.16	
10/25/82	7.6	201	2.77	1.17	1.97	0.02	0.04	1.07	
11/1/82	6.4	132	1.21	1.83	1.42	0.01	0.02	0.96	
11/8/82	8.1	264	0.78	0.91	1.31	0.00	0.03	0.94	
11/15/82	7.2	246	3.69	0.97	0.88	0.00	0.05	0.89	
11/22/82	6.8	65	1.14	2.41	1.41	0.00	0.03	1.03	
11/29/82	7.2	94	3.15	0.86	0.77	0.00	0.02	0.78	
12/6/82	7.8	35	0.81	0.74	1.26	0.00	0.01	0.77	
	Plant shut down during remainder of Year								
1/3/83	6.9	79	1.05	1.33	0.84	0.00	0.02	0.74	
1/10/83	7.6	110	0.46	0.78	0.35	0.00	0.02	0.66	

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Samples begin

	pH	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Date									
1/24/85	7.2	87	0.55	0.72	0.99	0.01	0.00	0.44	Samples clear
1/31/83	6.8	64	0.42	0.67	0.83	0.01	0.00	0.39	Samples clear
2/7/83	7.7	240	0.69	0.94	1.16	0.02	0.03	0.48	slight haze
2/14/83	7.2	340	0.77	0.66	0.89	0.02	0.04	0.36	clear to sl hz
2/21/83	7.9	210	0.43	0.57	0.82	0.01	0.02	0.42	clear to sl hz
2/28/83	6.7	185	0.93	0.74	0.61	0.01	0.01	0.38	clear
3/7/83	7.9	112	1.09	0.74	0.44	0.02	0.01	0.41	clear
3/14/83	8.1	180	0.82	0.51	[illegible]	0.01	[illegible]	0.40	clear
3/21/83	7.2	233	0.74	0.71	[illegible]	[illegible]	[illegible]	0.36	slight haze
3/28/83	6.8	140	0.89	0.71	0.41	0.00	0.01	0.37	clear
4/4/83	7.4	84	0.64	0.16	0.32	0.00	0.01	[illegible]	clear
4/11/83	8.1	170	0.73	[illegible]	0.33	[illegible]	0.01	[illegible]	clear
4/18/83	8.4	215	0.76	1.17	0.41	0.00	0.01	0.31	sl haze
4/25/83	7.9	187	1.22	0.91	[illegible]	[illegible]	0.02	0.34	" "
[illegible]	6.9	[illegible]	[illegible]	1.40	0.62	[illegible]	0.01	[illegible]	" "
5/9/83	6.8	110	0.73	0.65	0.70	[illegible]	[illegible]	[illegible]	clear
5/16/83	6.8	98	0.81	0.74	0.41	[illegible]	[illegible]	0.66	clear
[illegible]	6.9	58	0.11	[illegible]	[illegible]	[illegible]	0.01	[illegible]	clear
[illegible]	7.1	118	0.48	0.14	0.57	[illegible]	[illegible]	[illegible]	sl haze
6/6/83	7.4	128	0.76	0.71	[illegible]	[illegible]	[illegible]	[illegible]	clear
6/13/83	6.7	88	0.81	0.71	0.61	[illegible]	[illegible]	[illegible]	clear
[illegible]	7.3	114	0.62	0.41	0.66	[illegible]	0.01	0.36	sl haze
6/27/83	6.7	187	0.89	0.53	0.65	0.00	0.01	0.31	sl haze

Sampler was down for Month of July for cleaning and maintenance

959270284

United States Testing Company, Inc.
Environmental Sciences Division
1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

To: R Ldredv
Fr. J DAPICE

REPORT OF TEST

04970
NUMBER
October 24, 1980

CLIENT: Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

SUBJECT: Sample(s) submitted and identified by the Client as:
East Side Composite and West Side Composite

Project:

Chemical and Biological analysis of the submitted samples

Procedure:

The analyses were performed in accordance with the current United States Environmental Protection Agency procedural requirements for National Pollutant Discharge Elimination System Permits as specified by the Environmental Protection Agency, unless modifications or alterations of the specific procedures are indicated. The procedures can be found in the following specified references.

1) Methods for Chemical Analysis of Water and Wastes, Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio, 1979

2) Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 14th edition, 1975

3) Annual Book of Standards, part 31, 1979, American Society of Testing and Materials

AQ/DES
235-9

SIGNED FOR THE COMPANY

Prepared By

BY

E.Rider/br

Jose Machado

Allan Tordini

Laboratories in: New York • Chicago • Los Angeles • Tulsa • Memphis • Philadelphia • Richland

959270285

CLIENT: Tenneco Chemicals

04970
Number
10/24/80

Results:

		Sample		
		East Side Composite	West Side Composite	JM*
Mercury	(mg/l)	<0.0002	<0.0002	0.04
Cadmium	(mg/l)	<0.005	<0.005	0.60
Lead	(mg/l)	0.40	0.36	0.40
COD	(mg/l)	409	264	
Emulsified Oil & Grease	(mg/l)	17.5	15.5	
Floatable Oil & Grease	(mg/l)	11.5	7.5	
pH	(units)			
Chloride	(mg/l)	39.9	15.5	
Total Solids	(mg/l)	353	151	
Suspended Solids	(mg/l)	30	22	
Volatile Solids	(mg/l)	165	74	
Volatile Suspended Solids	(mg/l)	18	15	
Mineral Solids	(mg/l)	188	77	
Mineral Suspended Solids	(mg/l)	12	7	
BOD_5	(mg/l)	270	22	

" < " indicates non detected concentrations less than value shown

* Joint Meeting values

732

959270286

PRINCETON AQUA SCIENCE

789 Jersey Avenue • P.O. Box 151 • New Brunswick, New Jersey 08902 • Telephone (201) 846-8800

June 15, 1982

Mr. James J. Harrigan
Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Dear Mr. Harrigan:

The analyses of your 2 samples received May 25, 1982 have been completed. The results are presented in the attached tables.

All determinations were performed in accordance with Standard Methods, 15th Edition (1980). If there are any questions, please feel free to contact me.

Very truly yours,

PRINCETON AQUA SCIENCE

Daniel Chen

Daniel Chen, P.E.
Laboratory Manager

DC/mjs
Enclosure
#5253e

cc: Dr. Roy T. Gottesman
Tenneco/Accounts Payable

12/14/ℓ

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

800 SOUTH FIRST STREET
ELIZABETH, N. J. 07202
201-353-1313

December 9, 1982

Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian Cole

Dear Mr. Cole:

The following are our laboratory analyses of two composite samples of your plant effluent taken on November 18-19, 1982. The results are expressed as milligrams per liter unless otherwise noted.

Sample Location	Tank Area	Lab. Area
ph (Standard Units)	7.50	8.25
Total Cadmium	0.75 *	0.02
Total Chromium	0.03	0.02
Total Copper	0.54	0.13
Total Nickel	0.10	<0.01
Total Lead	1.31 *	0.55
Total Zinc	0.59	0.77
Total Mercury	3.6 *	0.011
Oil & Grease	33.7	3.4

The asterik indicates a violation of the Joint Meeting Regulations and/or the Elizabeth Sewer Use Ordinance.

If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Cathy L. Pullizzi

Cathy L. Pullizzi
Supervisor, Industrial
Surveillance & Pretreatment

CLP:hl
cc: George J. Minish, Esq.
Victor Vinegra, City Engineer

959270288

United States Testing Company, Inc.
Chemical Services Division
1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

January 24, 1983

NUMBER
71241

CLIENT: Tenneco Chemicals
830 Magnolia Avenue
Elizabeth, NJ
Att: John Sareka

BJECT: Two water samples supplied and identified by the client as:

Tank Farm #1 and #2 Composite
Lab #1 and Lab #2 Composite

AUTHORIZATION:

P.O. 112669.

PURPOSE:

Analysis for pH, Oil/Grease, BOD, TSS, Cadmium, Chromium, Copper, Nickel, Lead, Zinc, Mercury.

PROCEDURE: --

EPA Methods.

RESULTS:

	Tank Farm #1 & #2	Lab #1 & #2
pH	6.96	6.18
Oil & Grease, mg/l	67.0	7.00
BOD, mg/l	>800.	<10.0
Susp. Solids, mg/l	57.0	91.3
Cadmium, mg/l	0.40	0.03
Chromium, mg/l	<0.05	<0.05
Copper, mg/l	0.50	0.11
Nickel, mg/l	0.20	0.09
Lead, mg/l	0.66	1.14
Zinc, mg/l	0.57	0.12
Mercury , mg/l	0.021	0.115

SIGNED FOR THE COMPANY

BY

Eliezer Patxot

mgs

Form 803

959270289

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202
201-353-1313

January 25, 1983

Nuodex, Incorporated
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian Cole

Dear Mr. Cole:

On January 11, 1983, a grab sample of your plant effluent, at the Tank Farm Area, was taken for oil and grease analysis.

The oil and grease concentration of this sample was 1204 milligrams per liter. The City's Ordinance states a maximum allowable concentration of 100 milligrams per liter. Your plant effluent was therefore in violation of the City's Ordinance for Oil and Grease on the above date.

Enclosed, for your information, is a compilation of all test results for oil and grease analysis that were performed on Nuodex's effluent. A total of eight samples have been taken for oil and grease, five of which were in violation of the City's Ordinance.

Please take the necessary steps to reduce the oil and grease concentration of your effluent.

If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Cathy L. Pullizzi

Cathy L. Pullizzi
Supervisor, Industrial
Surveillance & Pretreatment

CLP:hl
Enclosure
cc: George J. Minish, Esq.
Victor Vinegra, City Engineer

RECEIVED
JAN 27

959270290

Nuodex, Incorporated (aka Tenneco)
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Sample Date	Sample Location	Oil & Grease (mg/l)
May 5, 1982	Lab Area	123 *
May 5, 1982	Tank Area	21,592 *
May 24, 1982	Tank Area	677.8 *
August 13, 1982	Tank Area	341 *
August 13, 1982	Lab Area	4.25
November 19, 1982	Lab Area	3.42
November 19, 1982	Tank Area	33.7
January 11, 1983	Tank Area	1204 *

Note: Asterik indicates a violation

Mcaprin

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202
201-353-1313

February 8, 1983

Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian Cole

Dear Sir:

Pursuant to your request, the following are our laboratory analyses of composite samples of your plant effluent taken on the dates indicated.

The results are expressed as milligrams per liter unless otherwise noted.

Date	1/25-26, 1983	1/26-27, 1983
Sample Point	Tank Area	Lab Area
pH (Standard Units)	8.25	8.25
Temperature °C	10	24
Biochemical Oxygen Demand	576	105
Total Suspended Solids	205	20
Total Cadmium	0.24	0.02
Total Chromium	0.03	0.02
Total Copper	0.70	0.14
Total Nickel	2.40	0.03
Total Lead	11.60	10.50
Total Zinc	2.98	0.57
Total Mercury	0.290	0.0063

Our results indicate that your plant effluent exceeded the limitations of the Joint Meeting Regulations and/or the City of Elizabeth Sewer Use Ordinance on the dates of sampling for cadmium, nickel, lead, zinc and mercury.

We are particularly concerned about the gross excess of our limitations for lead.

Please continue to keep us informed of the current status of your pretreatment efforts.

If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Allen S. Fornwald
Chief Officer, Industrial
Surveillance & Pretreatment

ASF:aa

cc: Victor Vinegra, City Engineer
George J. Minish, Esq.

United States Testing Company, Inc.

Chemical Services Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

February 16, 1983

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ
Att: Mr. John Sareka

NUMBER
71364

JBJECT: Two water samples supplied and identified by the client as:

1) #548 Lab Sewer 1/26 - 1/27
2) #549 Tank Farm 1/26/83

AUTHORIZATION:

P.O. #N105471.

PURPOSE:

Analysis for pH, Oil & Grease, TSS, Cadmium, Chromium, Copper, Nickel, Lead, Zinc, Mercury.

PROCEDURE:

EPA Methods.

RESULTS:

	Lab #548	Tank Farm #549
pH	11.06	10.39
Oil & Grease, mg/l	59.0	41.0
Susp. Solids, mg/l	146.0	26.6
Cadmium, mg/l	0.17	0.02
Chromium, mg/l	< 0.05	< 0.05
Copper, mg/l	0.38	0.11
Nickel, mg/l	0.86	0.05
Lead, mg/l	6.34	7.83
Zinc, mg/l	0.56	1.74
Mercury, mg/l	0.176	0.013

SIGNED FOR THE COMPANY

BY [signature]
Eliezer Patxot

mgs

boratories in: New York • Chicago • Los Angeles • Tulsa • Memphis • Philadelphia • Richland

Form 801

959270294

JOINT MEETING
MAINTENANCE
IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES
500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202
201-353-1313

February 23, 1983

Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian Cole

Dear Mr. Cole:

We are in receipt of your monthly progress report for January, 1983. Pursuant to your request, we will forward a copy of our regulations to Dr. Ciprini as soon as possible.

Your concern as to the "integrity" of samples which we split with you is noted. We have adopted the policy of compositing samples in our laboratory and splitting the composites with industry for several reasons:

1. Our field crews are not trained as laboratory personnel.
2. By following strict laboratory procedures and quality assurance practices, any possible sample handling errors should be eliminated.
3. Fewer sample - handling steps are performed by this procedure thereby reducing any potential for error.

If this procedure is not acceptable to you, we invite a representative of your organization to be present while compositing is performed by our laboratory staff.

A grab sample of your plant effluent (tank area) was taken on February 16, 1983 for Oil and Grease analysis. The oil and grease concentration in this sample was 1896 milligrams per liter, indicating a gross violation of the Joint Meeting Regulations and the City's Ordinance.

If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Cathy L. Pullizzi

Cathy L. Pullizzi
Supervisor, Industrial
Surveillance & Pretreatment

CLP:hl

cc: George J. Minish, Esq.
Victor Vinegra, City Engineer

Chemical Services Division
1415 PARK A NUE • HOBOKEN, NEW JERSEY 07030 • 792-2400

REPORT OF TEST

March 1, 1983

NUMBER
71406

…IENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Attn: Mr. J. Harrigan

SUBJECT: One water sample from Boiler Room Sump Outlet of 2/16/83.

AUTHORIZATION:

P.O.NI05616.

PURPOSE:

Analysis for pH and Oil & Grease.

PROCEDURE:

EPA Methods.

RESULTS:

pH	6.57
Oil & Grease, mg/l	92.4

SIGNED FOR THE COMPANY

BY [signature]
Eliezer Patxot

mgs

Form 803

959270297

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202
201-[illegible]

March 18, 1983

Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07202

Attention: Mr. Brian Cole

Dear Sir:

The following is our laboratory analysis of a grab sample of your plant effluent taken for oil and grease on March 11, 1983.

pH	7.6	Standard Units
Temperature		34 °C
Oil and Grease		6 mg/l

I am pleased to report that your plant effluent was in compliance with the limitations of the Joint Meeting Regulations for the sample taken.

Thank you for your cooperation with our sampling team.

Very truly yours,

Allen S. Fornwald
Allen S. Fornwald
Chief Officer, Industrial
Surveillance & Pretreatment

ASF:aa

Rec 3/22/83

959270298

JOINT MEETING
MAINTENANCE
IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES
500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

April 19, 1983

Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07202

Attention: Mr. B. Cole

Dear Sir:

The following is our Laboratory analysis of a sample of your plant effluent taken on April 5-6, 1983.

The results are in milligrams per liter unless otherwise noted. ND means "not detected."

Temperature (oC)	18oC		Total Cadmium	0.08	
Total Organic Carbon	108		Total Chromium	0.01	
Biochemical Oxygen Demand	205	160	Total Copper	0.10	0.15
Total Suspended Solids	25	58	Total Nickel	0.08	
pH (Standard Units)	6.45	7.83	Total Lead	2.65	
			Total Zinc	1.37	
			Total Mercury	0.51	0.005

Our analyses show that your plant effluent exceeds the limitations of the Elizabeth Sewer Use Ordinance and/or the Joint Meeting Regulations for violations for Lead and Mercury.

Please be advised that this letter serves as formal notice that your plant effluent is in violation of the Ordinance listed and that this violation(s) must be corrected immediately.

Very truly yours,

Allen S. Fornwald
Chief Officer, Industrial
Surveillance & Pretreatment

ASF:hl
Enclosure

cc: George J. Minish, Esq.
Victor Vinegra, City Engineer

United States Testing Company, Inc.

Chemical Services Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

May 9, 1983

NUMBER
71557

CLIENT: Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Att: Mr. J. Harrigan

SUBJECT: One water sample of 4/5/83 and 4/6/83 supplied by the client and identified as: Tank Farm

AUTHORIZATION:

P.O. 105616-01.

PURPOSE:

Analysis as per client's P.O.

PROCEDURE:

EPA Methods.

RESULTS:

pH	7.83
Oil+Grease, mg/l	1,121.0
BOD, mg/l	190.
Susp. Solids, mg/l	58.0
Cadmium (Total) mg/l	0.12
Chromium (Total) mg/l	< 0.05
Copper (Total) mg/l	0.15
Nickel (Total) mg/l	0.08
Lead (Total) mg/l	3.72
Zinc (Total) mg/l	2.12
Mercury (Total) mg/l	0.005

SIGNED FOR THE COMPANY

BY Eliezer Patxot

mgs

Laboratories in: New York • Chicago • Los Angeles • Tulsa • Memphis • Philadelphia • Richland

Form 803

959270300

XX [illegible]

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

201-353-1313

August 11, 1983

Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian D. Cole

Dear Sir:

The following is our laboratory analysis of a grab sample of your plant effluent taken for oil and grease on July 29, 1983.

pH 6.85 Standard Units
Temperature 25 °C
Oil and Grease 30 mg/l

I am pleased to report that your plant effluent was in compliance with the limitations of the Joint Meeting Regulations for the sample taken.

Thank you for your cooperation with our sampling team.

Very truly yours,

Allen S. Fornwald
Chief Officer, Industrial
Surveillance & Pretreatment

ASF:aa

United States Testing Company, Inc.

Chemical Services Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

NUMBER 71900

CLIENT: Nuodes, Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Att: Mr. J. Harrigan

SUBJECT: One water sample of 7/29/83 identified as ~~xxxx~~ sewer outlet garb

AUTHORIZATION:

P.O. N1077

PROCEDURE:

EPA Methods

Results:

Oil and grease mg/l 10.0

SIGNED FOR THE COMPANY

BY Eliezer Patxot

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rmb

Laboratories in: New York • Chicago • Los Angeles • Tulsa • Memphis • Philadelphia • Richland

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

June 17, 1983

Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07202

Attention: Mr. Brian Cole

Dear Mr. Cole:

The following is our laboratory analysis of a composite sample of your plant effluent taken on May 31 - June 1, 1983. The results are expressed as milligrams per liter unless otherwise noted.

Sample Location:	Tank Farm	Total Copper	0.09
ph(Standard Units)	6.65	Total Nickel	0.12
Temperature (°C)	19	Total Lead	0.55
Total Cadmium	0.05	Total Zinc	0.94
Total Chromium	0.01	Total Mercury	0.26

If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Cathy L. Pullizzi

Cathy L. Pullizzi
Supervisor, Industrial
Surveillance & Pretreatment

CLP:hl

cc: George J. Minish, Esq.
Victor Vinegra, City Engineer

Chemical Services Division
1415 PARK A UE • HOBOKEN, NEW JERSEY 07030 • 2 792-2400

REPORT OF TEST

July 1, 1983

NUMBER
71692

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Attention: Mr. J. Harrigan

SUBJECT: One (1) water sample water of June 1, 1983.

AUTHORIZATION

P.O. #N-105616

PURPOSE

To determine pH, Oil and Grease, BOD, TSS, Total Cadmium, Total Chromium, Total Copper, Total Nickel, Total Lead, Total Zinc and Total Mercury.

PROCEDURE

EPA Method.

RESULTS

pH	7.25
Oil and Grease, mg/l	10.0
BOD, mg/l	585.0
Suspended Solids, mg/l	24.0
Cadmium (total), mg/l	0.05
Chromium (total), mg/l	< 0.05
Copper (total), mg/l	0.12
Nickel (total), mg/l	0.09
Lead (total), mg/l	0.35
Zinc (total), mg/l	1.10
Mercury (total, mg/l	0.029

* * *

SIGNED FOR THE COMPANY

BY

Eliezer Patxot

mg

Laboratories in: New York • Chicago • Los Angeles • Tulsa • Memphis • Philadelphia • Richland

Form 803

959270304

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202
201-353-1313

November 20, 1984

Nuodex, Inc.
830 Magnolia Ave.
Elizabeth New Jersey 07201

Attn: Mr. John Saraka

Dear Sir:

The following is our laboratory analysis of a grab sample of your plant effluent taken for Oil and Grease on the date indicated.

Sample Date November 8, 1984
Sample Time 1407
pH (Std Units) 6.33
Temperature (C) 20'
Oil & Grease (mg/l) 363

Your plant effluent was in violation of the limitations of the Joint Meeting Regulations on the above date.

The maximum allowable oil and grease concentration is 100 mg/l. Our pH limitation is 6 to 9 Standard Units.

This letter serves as formal notice of the violation(s). The violation(s) must be corrected immediately.

If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Allen S. Fornwald

Allen S. Fornwald
Chief Officer, Industrial
Surveillance & Pretreatment

ASF:hl

cc: George Minish, Esq.
Victor Vinegra, City Engineer

Metals and Environmental Chemistry Division

1415 P[illegible] AVENUE • HOBOKEN, NEW JERSEY 0703[illegible] 201-792-2400

REPORT OF TEST

December 13, 1984

NUMBER 72586

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Attn: J. Harrigan

SUBJECT: 1 Grab sample of 10/25/84.

AUTHORIZATION:

As per conversation with client.

PURPOSE:

Analyze Grab sample for pH, Oil & Grease, TSS, BOD.

PROCEDURE:

pH was analyzed by meter, Oil & Grease were analyzed by IR Spectroscopy, TSS was analyzed gravimetrically, and BOD was analyzed according to standard methods.

RESULTS:

pH	7.3 pH units
Oil & Grease	40 mg/l
TSS	44 mg/l
BOD	278 mg/l

SIGNED FOR THE COMPANY

BY Frank Buczynski

Frank Buczynski

sm

959270306

United States Testing Company, Inc.

Metals and Environmental Chemistry Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

December 13, 1984

NUMBER

72618

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Attn: J. Harrigan

SUBJECT:

1 Grab sample of 11/08/84.

AUTHORIZATION:

P.O. # 142220

PURPOSE:

Analyze Grab sample for pH, Oil & Grease, TSS, BOD.

PROCEDURE:

pH was analyzed by meter, Oil & Grease were analyzed by IR Spectroscopy, TSS was analyzed gravimetrically, and BOD was analyzed according to standard methods.

RESULTS:

pH	7.1 pH units
Oil & Grease	49 mg/l
TSS	10 mg/l
BOD	590 mg/l

SIGNED FOR THE COMPANY

BY

Frank Buczynski

Frank Buczynski

sm

959270307

JOINT MEETING
MAINTENANCE
IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES
500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202
201-353-1313

September 1, 1983

Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian D. Cole

Dear Mr. Cole:

The following is our laboratory analysis of a composite sample of your plant effluent taken on August 8-9, 1983.

The results are expressed as milligrams per liter unless otherwise noted. Asterisk indicates a violation of the Joint Meeting Regulations and/or the City's Ordinance.

Temperature (°C)	35	Total Chromium	0.02
pH (Standard Units)	7.05	Total Copper	0.13
Total Organic Carbon	222	Total Nickel	0.07
Biochemical Oxygen Demand	576	Total Lead	0.55
Total Suspended Solids	8	Total Zinc	0.30
Total Cadmium	0.09	Total Mercury	0.33*

If you have any questions or require any further information regarding this matter, please do not hesitate to contact us.

Very truly yours,

Cathy L. Pullizzi

Cathy L. Pullizzi
Supervisor, Industrial
Surveillance & Pretreatment

CLP:hl
cc: George J. Minish, Esq.
Victor Vinegra, City Eng.

RECEIVED
SEP _ _ 1983

959270308

United States Testing Company, Inc.

Chemical Services Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

NUMBER 71901

CLIENT: Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Att: Mr. Jim Harrigan

UBJECT: One waater sample of 8/8 - 8/9 identified as 24 hour composition sewer effluent.

AUTHORIZATION:

P.O. N1077

PROCEDURE:

EPA Method

RESULTS:

PH	7.06
Oil + Grease, mg/l	40.0
BOD, mg/l	628.
Susp. Solids, mg/l	115.
Cadium, mg/l	0.03
Chromium, mg/l	<0.05
Copper, mg/l	<0.02
Nickel, mg/l	<0.04
Lead, mg/l	0.16
Zinc, mg/l	0.09
Mercury, mg/l	0.005

SIGNED FOR THE COMPANY

BY [signature]
Eliezer Patxot

rmb

959270309

United States Testing Company, Inc.

Metals and Environmental Chemistry Division

1... PARK AVENUE • HOBOKEN, NEW JERSEY 0... • 201-792-2400

REPORT OF TEST

February 6, 1984

NUMBER 72033

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Attn: Mr. Jim Harrigan

SUBJECT: One water sample of 12/12/83 supplied and identified by the client as:

Sewer Outflow

AUTHORIZATION:

Release #6 N-105616.

PURPOSE:

Oil & Grease analysis.

PROCEDURE:

EPA Methods.

RESULTS:

Oil & Grease - 36.0 mg/l

SIGNED FOR THE COMPANY

BY Eliezer Patxot

mgs

Laboratories in: New York • Chicago • Los Angeles • Houston • Tulsa • Memphis • Modesto • Richland

959270310

M Cepiuin

to DM.E.

JOINT MEETING

MAINTENANCE

IN THE MATTER OF AN OUTLET SEWER
AND TREATMENT PLANT
FOR CERTAIN MUNICIPALITIES
IN ESSEX AND UNION COUNTIES

500 SOUTH FIRST STREET
ELIZABETH, N. J. 07202

February 24, 1984

Nuodex Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Attention: Mr. Brian Cole

Dear Sir:

The following is our Laboratory analysis of a sample of your plant effluent taken on January 5-6, 1984.

The results are in milligrams per liter unless otherwise noted. ND means "not detected."

Temperature (oC)	6.55	Total Cadmium	0.11
Total Organic Carbon	18	Total Chromium	0.02
Biochemical Oxygen Demand	3000	Total Copper	0.22
Total Suspended Solids	5595	Total Nickel	0.19
pH (Standard Units)	78	Total Lead	0.65
Mercury	14.63	Total Zinc	2.28

Our analyses show that your plant effluent exceeds the limitations of the Elizabeth Sewer Use Ordinance and/or the Joint Meeting Regulations for Mercury.

Please be advised that this letter serves as formal notice that your plant effluent is in violation of the Ordinance listed and that this violation(s) must be corrected immediately.

Very truly yours,

Allen S. Fornwald
Chief Officer, Industrial
Surveillance & Pretreatment

ASF:hl
Enclosure

cc: George J. Minish, Esq.
Victor Vinegra, CityEngineer

959270311

United States Testing Company, Inc.

Metals and Environmental Chemistry Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

January 20, 1984

NUMBER 72056

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, N.J.
Attn: Mr. John Sareka

SUBJECT: One water sample of 1/5/84-1/6/84 supplied by the client.

AUTHORIZATION:

P.O. N112217.

PURPOSE:

Analysis for pH, Oil & Grease, BOD, Suspended Solids, Cadmium, Chromium, Copper, Nickel, Lead, Zinc and Mercury.

PROCEDURE:

EPA Methods.

RECEIVED

RESULTS:

pH	6.22
Oil & Grease, mg/l	115.0
BOD, mg/l	> 1,750.0
Suspended Solids, mg/l	92.0
Cadmium, mg/l	0.12
Chromium, mg/l	< 0.05
Copper, mg/l	0.26
Nickel, mg/l	0.25
Lead, mg/l	0.66
Zinc, mg/l	1.50
Mercury, mg/l	2.30

SIGNED FOR THE COMPANY

BY [signature]
Eliezer Patxot

959270312

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

October 16, 1984

NUMBER

72469

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ
Attn: Mr. John Harrigan

SUBJECT:

Water sample of 8/22/84 - 8/23/84

AUTHORIZATION:

P.O. # N 112217

PURPOSE:

Analysis for pH, Oil & Grease, BOD, Suspended Solids Cadmium, Chromium, Copper, Nickel, Lead, Zinc and Mercury

PROCEDURE:

EPA Methods

RESULTS:

pH	6.73
Oil & Grease, mg/l*	—
BOD, mg/l	675.
Suspended Solids, mg/l	20.0
Cadmium, mg/l	0.16
Chromium, mg/l	0.04
Copper, mg/l	0.06
Nickel, mg/l	1.24
Lead, mg/l	0.28
Zinc, mg/l	4.56
Mercury, mg/l*	—

* Not sufficient sample to perform analysis

SIGNED FOR THE COMPANY

BY

Eliezer Patxot

sm

959270313

United States Testing Company, Inc.
Metals and Environmental Chemistry Division
1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

July 16, 1984

NUMBER
72334

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Attn: Mr. J. Harrigan

SUBJECT:

One water sample:

24 hour composite of 6/19/84 to 6/20/84

AUTHORIZATION:

N112217

PURPOSE:

Analysis for pH, Oil & Grease, BOD, Suspended Solids, Cadmium, Chromium, Copper, Nickel, Lead, Zinc and Mercury

PROCEDURE:

EPA Methods.

RESULTS:

pH	7.18
Oil & Grease, mg/l	42.0
BOD, mg/l	30.0
Suspended Solids, mg/l	15.0
Cadmium, mg/l	0.09
Chromium, mg/l	<0.05
Copper, mg/l	0.07
Nickel, mg/l	0.27
Lead, mg/l	0.11
Zinc, mg/l	0.26
Mercury, mg/l	0.07

SIGNED FOR THE COMPANY

BY

Eliezer Patxot

sm

Laboratories in: New York • Chicago • Los Angeles • Houston • Tulsa • Memphis • Modesto • Richland

United States Testing Company, Inc.

Metals and Environmental Chemistry Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

November 29, 1984

NUMBER

72566

CLIENT: Nuodex Inc.
830 Magnolia Ave.
Elizabeth, NJ 07201
J. Harrigan

SUBJECT:

1 sample identified as:

Eliz. Plant Effluent 10/15 - 10/16/84

AUTHORIZATION:

N 112217

PURPOSE:

Analyze Effluent sample for pH, Oil & Grease, BOD, TSS, Cadmium, Chromium, Copper, Nickel, Lead, Zinc, and Mercury.

PROCEDURE:

Metals were determined by ICP and AA. TSS and Oil & Grease were determined Gravametrically. pH was analyzed by meter, and BOD analyzed by method 405.1 (MCAWW).

SIGNED FOR THE COMPANY

BY

Frank Buczynski

sm

959270315

United States Testing Company, Inc.

CLIENT:

Nuodex Inc.

Number

72566

RESULTS:

pH	6.58	
TSS	92	mg/l
Oil & Grease	4	mg/l
BOD	660	mg/l
Cadmium	0.23	mg/l
Chromium	<0.02	mg/l
Copper	0.22	mg/l
Nickel	0.45	mg/l
Lead	<0.05	mg/l
Zinc	0.32	mg/l
Mercury	0.004	mg/l

Metals and Environmental Chemistry Division
1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 201-792-2400

REPORT OF TEST

February 5, 1985

NUMBER 72761

CLIENT: Nuodex Inc.
830 Magnolia Avenue
Elizabeth, NJ 07201
Attn: J. Harrigan

SUBJECT: 1 Grab sample of 1/25/85

AUTHORIZATION:

As per conversation with client.

PURPOSE:

Analyze Grab sample for pH,
Oil & Grease.

PROCEDURE:

EPA Methods

RESULTS:

pH	1.90 pH units	pH lowered at plant to fix sample
Oil & Grease	139.0 mg/l	

SIGNED FOR THE COMPANY

BY

Frank Buczynski

Page 1 of 1
sm

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

March 19, 1985

Mr. J. Harrigan
Nuodex, Inc.
830 Magnolia Avenue
Elizabeth, New Jersey 07201

Dear Mr. Harrigan:

Analysis of the water samples received February 26, 1985 and March 1, 1985 has been completed. The results are presented in the attached tables.

The determinations were performed in accordance with EPA/NJDEP Approved Methodology.

An invoice is enclosed for the analysis. If you have any questions, please feel free to contact me.

Very truly yours,

PRINCETON AQUA SCIENCE

Thomas Grenci

Thomas Grenci
Laboratory Manager

TG/mjs
Enclosure
#5647

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company Nuodex, Inc.

Address 830 Magnolia Avenue

City Elizabeth State NJ Zip 07201

To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 3/19/85
Auth.:
Lot #: 6953
Invoice #: 10870
Sample Date: 2/25/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Grab Sample (mg/l)
pH (units)	*
Oil & Grease	410

*Sample was received in the laboratory already preserved with acid. The pH of the sample received was 1.5.

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company Nuodex, Inc.
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 3/19/85
Auth.:
Lot #: 6953
Invoice #: 10870
Sample Date: 2/25-26/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Plant Effluent 24 Hour Composite (mg/l)
pH (units)	6.5
BOD	170
Oil & Grease	14
Total Suspended Solids	8
Antimony	<0.03
Arsenic	<0.01
Beryllium	<0.002
Cadmium	0.003
Chromium	<0.01
Copper	0.2
Lead	0.3
Mercury	0.02
Nickel	1
Selenium	<0.01
Silver	<0.002
Thallium	<0.01
Zinc	2.7

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company Nuodex, Inc.

Address 830 Magnolia Avenue

City Elizabeth State NJ Zip 07201

To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 3/19/85
Auth.:
Lot #: 6953
Invoice #: 10870
Sample Date: 2/26/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Grab Sample (mg/l)
pH (units)	6.2
Oil & Grease	210

Environmental Scientists & Engineers

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company Nuodex, Inc.

Address 830 Magnolia Avenue

City Elizabeth State NJ Zip 07201

To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 2/22/85
Auth.:
Lot #: 6958
Invoice #: 10870
Sample Date: 2/26-27/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Plant Effluent 24 Hour Composite (mg/l)
BOD	240
pH (units)	6.3
Total Suspended Solids	14
Antimony	<0.04
Arsenic	<0.01
Beryllium	<0.003
Cadmium	0.5
Chromium	<0.03
Copper	0.16
Lead	0.2
Mercury	0.11
Nickel	0.64
Selenium	<0.01
Silver	0.002
Thallium	<0.01
Zinc	2.7

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company: Nuodex, Inc.

Address: 830 Magnolia Avenue

City: Elizabeth State: NJ Zip: 07201

To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 2/22/85
Auth.:
Lot #: 6958
Invoice #: 10870
Sample Date: 2/27/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Grab Sample (mg/l)
pH (units)	7.0
Oil & Grease	3

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company: Nuodex, Inc.
Address: 830 Magnolia Avenue
City: Elizabeth State: NJ Zip: 07201
To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 3/19/85
Auth.:
Lot #: 6779
Invoice #: 10870
Sample Date: 2/27-28/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Plant Effluent 24 Hour Composite (mg/l)
pH (units)	6.4
BOD	100
Total Suspended Solids	10
Antimony	<0.04
Arsenic	<0.01
Beryllium	<0.002
Cadmium	0.04
Chromium	<0.03
Copper	0.09
Lead	0.5
Mercury	0.08
Nickel	0.26
Selenium	<0.01
Silver	0.005
Thallium	<0.01
Zinc	1.0

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company: Nuodex, Inc.	Job #: 5647
	Date: 3/19/85
Address: 830 Magnolia Avenue	Auth.:
	Lot #: 6779
City: Elizabeth State: NJ Zip: 07201	Invoice #: 10870
	Sample Date: 2/28/85
To Attn. of: Mr. J. Harrigan	N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Grab Sample (mg/l)
pH (units)	*
Oil and Grease	12

*Sample was received in the laboratory already preserved with acid. The pH of the sample received [illegible].3

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company Nuodex, Inc.
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 3/19/85
Auth.:
Lot #: 6785
Invoice #: 10870
Sample Date: 2/28-3/1/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Plant Effluent 24 Hour Composite (mg/l)
pH (units)	5.8
BOD	160
Total Suspended Solids	<1
Antimony	<0.04
Arsenic	<0.01
Beryllium	<0.002
Cadmium	0.08
Chromium	<0.03
Copper	0.4
Lead	0.5
Mercury	0.08
Nickel	0.65
Selenium	<0.01
Silver	<0.002
Thallium	<0.01
Zinc	2.0

PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Company Nuodex, Inc.
Address 830 Magnolia Avenue
City Elizabeth State NJ Zip 07201
To Attn. of: Mr. J. Harrigan

Job #: 5647
Date: 3/19/85
Auth.:
Lot #: 6785
Invoice #: 10870
Sample Date: 3/1/85
N.J. Lab Certification ID# 12064

REPORT OF ANALYSIS

	Grab Sample (mg/l)
pH (units)	6.2
Oil & Grease	35

PAS-85-8426

NUODEX INC.
ELIZABETH, NEW JERSEY

REVISED SAMPLING AND ANALYSIS PLAN FOR COMPLIANCE WITH THE ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT (ECRA)

NOVEMBER 4, 1985

pas PRINCETON AQUA SCIENCE

165 Fieldcrest Avenue • CN 7809 • Edison, New Jersey 08818-7809 • Telephone (201) 225-2000

Nuodex Inc.
Elizabeth, New Jersey

Table of Contents

REVISED SAMPLING AND ANALYSIS

List of Tables

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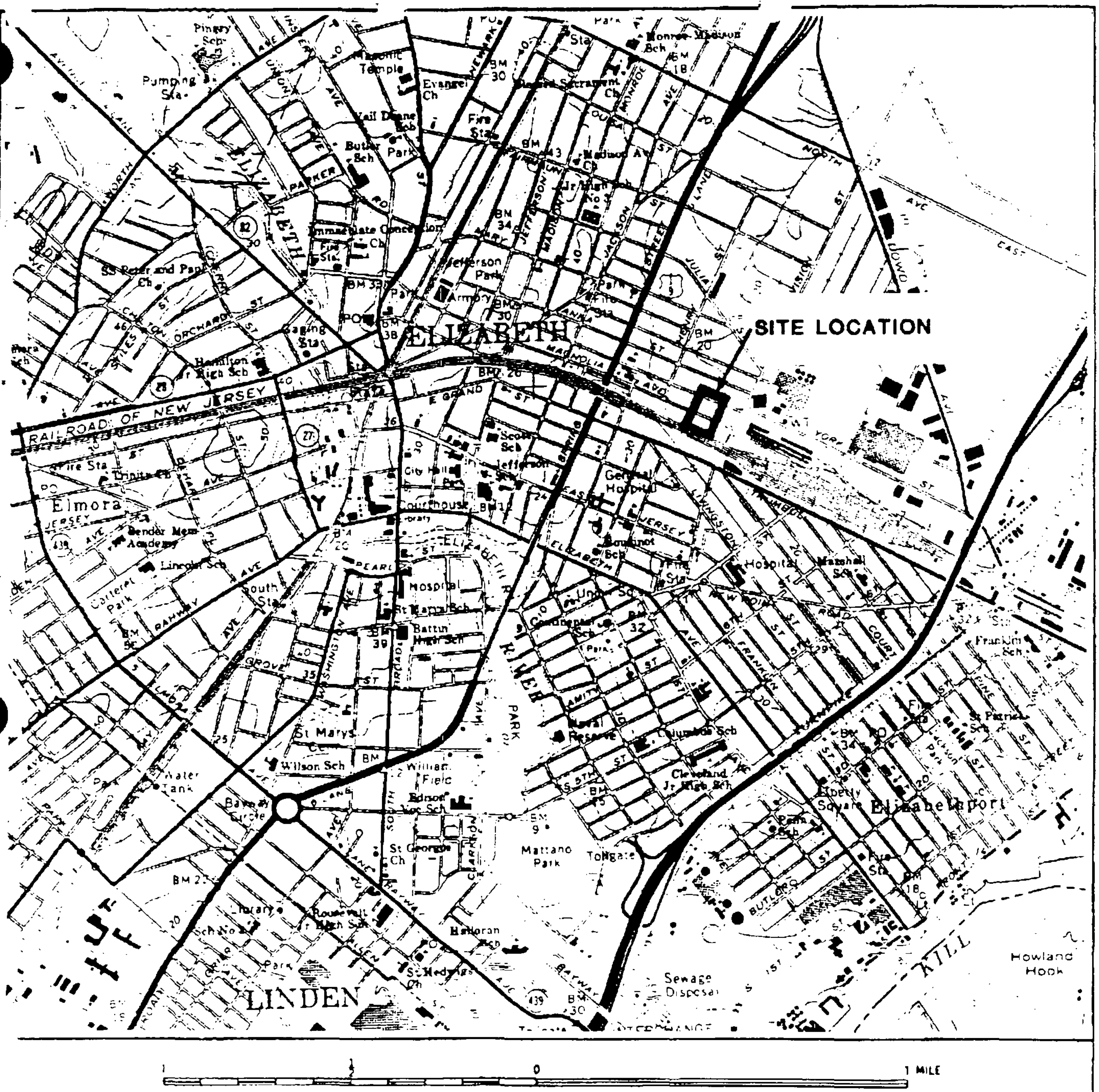
INTRODUCTION

This Sampling and Analysis Plan has been prepared for the Nuodex Inc. facility located at 830 Magnolia Avenue, Elizabeth, New Jersey (see Figure 1). The revisions incorporated into this plan are in response to the deficiencies noted in the New Jersey Department of Environmental Protection (NJDEP) letter of "Inspection Results" received October 7, 1985. Information supplied by Nuodex Inc. and results of previous environmental sampling at this facility have been employed, where appropriate, to define areas of concern and analytical parameters.

The Plan has been developed in accordance with the requirements of N.J.A.C. 7:1-3.7(d)14 under the Environmental Cleanup Responsibility Act (ECRA).



SOURCE:

U.S.G.S 7.5 MINUTE SERIES,
ELIZABETH QUADRANGLE

FIGURE 1

SITE LOCATION MAP

NUODEX INC.
ELIZABETH, N.J.

ENVIRONMENTAL SETTING

The Nuodex Inc. facility in Elizabeth, New Jersey is located in an industrial/commercial area adjacent to U. S. Highway #1. The facility was purchased by Nuodex Inc. from Tenneco Chemicals, Inc. on December 22, 1982. Surficial soils consist of sand, silt, and gravel fill ranging in thickness from six (6) inches to approximately 10 feet in some areas, based upon borings conducted at the site from 1981-1982. The fill material is underlain by glacial ground moraine composed of red clay to sandy clay with some gravel. The depth to red shale/sandstone bedrock is between 30 and 50 feet. Permeability testing was conducted on shelly tube samples of the fill material and clay. The fill has a permeability ranging between 3.3×10^{-4} cm/sec and 8.5×10^{-5} cm/sec. The clay ranges from 5.1×10^{-7} cm/sec to 4.6×10^{-8} cm/sec.

Groundwater was not encountered to a depth of 16.5 feet. However, perched water was detected in the fill material underlying the railroad tracks in the rear of the property. Local topography and relative location of surface waters suggest that groundwater flows in an easterly direction towards Newark Bay.

References:

(1) PAS reports dated between 1981 and 1982 on the Tenneco Elizabeth facility.

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

Certain areas of this Nuodex facility have been identified as areas of potential environmental concern. In addition one (1) site has been selected to provide data on background contaminants present in this urban, industrial area.

The majority of this property is covered by concrete, macadam or buildings. This has effectively isolated the soils in these areas from any contaminants generated by Nuodex. Open soil potentially receiving hazardous wastes/materials exist at the rail spur along the southern border of the property, in the open crawl space below the vinyl department and at portions of the drum storage adjacent to Warehouse II. The parking lot on the north side of Magnolia Avenue is not paved. However, the use of this area has been restricted to parking of employee vehicles only. This is not anticipated to be an area of environmental concern.

During a 12 month period in 1981 and 1982 Princeton Aqua Science (PAS) conducted extensive sampling and analysis at the rail spur and vinyl department crawl space areas at the request of Tenneco Chemicals, Inc. the former owner of the facility. The scope and results of this program are discussed in detail in "Sample Locations" and the "Summary of Analytical Investigations from 5/8/81 to 5/5/82 Tenneco Chemicals, Inc., Elizabeth, New Jersey Facility". The text of the results is contained in Volume I of the "General Information and Site Evaluation Submissions" dated the building. The water flows by gravity to the sump adjacent to the vinyl department and is recylced to the onsite mercury treatment system. This system in combination with reduced rail usage has virtually eliminated any further potential for contamination of this area.

Area B - Vinyl Department

An open crawl space exists below the vinyl department production floor. It appears that this area was contaminated through leakage of underground pipes leading from the floor drains. The wash water from cleanup of floors in the vinyl department entered these floor drains and ultimately the clay pipe network below the crawl space. At some indeterminate time this pipe system developed leaks allowing wash water to leach into the soil. Principal contaminants have been identified as cadmium, barium, lead, mercury, organic solvents and petroleum hydrocarbons. The floor drains were sealed in 1982 at the same time as the installation of the collection system referred to in Area A above.

Area C - Background

Selection of a background sampling site within the manufacturing or warehousing areas is not feasible. The intensity of industrial use in these areas renders any open area subject to contamination.

Therefore, background sampling will be conducted at the parking lot located on the north side of Magnolia Avenue.

Area D - Warehouse II Yard

The vast majority of the yard adjacent to Warehouse II had been paved with concrete. However, this paving process had been conducted in stages and areas of discontinuity between the slabs exist. The yard is used for storage of organic solvents.

Area E - Loading Platforms

An area of potential contamination exists beneath the loading platform at Warehouse I. This area is used exclusively for the transfer of packaged material (i.e. drums of final product) and no spills have been reported. No information regarding construction methods below the loading dock is available. The presence of an impervious concrete slab normally associated with this type of construction cannot be assumed. Therefore, this area will be considered as a potential environmental pathway via open soil.

Area F - Tanks TF-5 and TF-6

Tank TF-5 and TF-6 are located in the yard adjacent to the boiler house. They compose part of the wastewater treatment system for the facility. Tank TF-5 is used for the collection of organic wastes (i.e. spent solvent). Tank TF-6 is an oil-water separator. The potential exists for contaminants from these vessels to reach the environment via gravel and open soil at their perimeter.

Area G - Shed Adjacent to Underground Tanks

Due to the presence of gravel over open soil at the shed adjacent to the underground storage tanks this area will be considered of potential environmental concern.

Area H - Tanks TF-7, TF-8A and TF-8B

Visual staining of the soil was evident below tanks TF-7, TF-8A and TF-8B. Sampling will be conducted in this location to assess the impact of any incidental leakage or spills.

SAMPLE LOCATIONS

A significant volume of soil sample data has been generated for the area of the railroad siding and the vinyl department crawl space. This information has indicated the presence of mercury, barium, cadmium, lead and organic contaminants in the soil. Therefore, the initial phase of sampling intended to define the existance and type of contamination has been accomplished. Further sampling to these ends will be limited under this plan. Instead, the emphasis in these locations will be to define horizontal and vertical extent of the contaminants.

Remedial action was undertaken by Tenneco Chemicals to address the most heavily contaminated soils at the facility. This included the excavation of a trench (200 foot long x 30 inches wide x 18 inches deep) adjacent to the mercury and vinyl departments and parallel to the rail siding.

The removal of oil sludge, soil and gravel at the rail siding was conducted concurrent with the trench excavation. All wastes generated in this cleanup were disposed of in an approved, secure landfill.

Contaminated perched groundwater noted in completing soil borings at the rail siding is collected through a leachate recovery system. This system consists of perforated pipe buried parallel to the tracks and discharging into a sump at the south eastern corner of the property. Contaminated leachate is treated onsite to remove metal contaminants prior to discharge to Joint Meeting.

The following is a discussion of proposed sampling at all areas of potential concern. The assessment of possible contaminant impacts to soil and groundwater are detailed idependently. Where USEPA Priority Pollutant analysis is indicated it shall include the NBS/Wiley library search of the respective organic fractions.

SOIL BORINGS

Area A - Rail Siding

(Boring designations: A-1 through A-8 and MW-1, MW-2)

Soil borings will be completed to a depth of 15 feet at 8 locations. Additionally, two (2) monitoring wells are proposed for this area. Soil samples will be collected and analyzed at the well locations in the same manner as described for the borings. The specific locations of the borings have been weighted towards areas previously demonstrated to have the highest contamination.

Samples will be collected by split spoon auger in two (2) foot increments continuously through the boring. Samples will be selected from the top six (6) inch increment of each two (2) foot auger (0-6", 24-30", 48-54", etc.) for collection. Should complete spoon recovery not be possible the approximate depth and volume of recovery will be noted. Sample collection will begin immediately below any gravel layer present at the siding.

Samples collected from five (5) depths at each boring will be analyzed. The sample depths will be 0-6", 48-54", 96-102" and 168-174". A final six (6) inch increment will be collected and analyzed from soil immediately above the clay layer based on a field determination of soil strata. Analysis will be performed on all samples for mercury, lead, cadmium, zinc and barium. These parameters have been demonstrated to exist at the greatest levels and will serve as indicator parameters. Additionally, all 0-6" samples will be analyzed for total petroleum hydrocarbons.

To further describe the types of contaminants present in this area a composite of three (3) samples will be selected for U.S.E.P.A. Priority Pollutant Plus 40 and xylene analysis. The samples will be collected at three (3) borings. The 0-6" soil sample at borings A-4, A-6 and monitoring well MW-1 will be analyzed for all parameters except volatile organics. The six (6) inch increment above the clay layer at each of these borings will be composited and analyzed for the volatile organic fraction. Soil boring A-4 will be located at the point of discharge of non-contact cooling water noted during the Bureau of Industrial Site Evaluation (BISE) facility inspection.

Area B - Vinyl Department Crawl Space

(Boring designation: B-1 through B-4)

Access to soil below the vinyl department is severly restricted by the height of the crawl space (18" and less) and the exposure risk to sample technicians posed by the soil contaminants. Therefore, sample collection will be executed through borings completed at the perimeter of the building and through the production room floor.

Soil borings A-4 and A-5 will be completed in the rail siding adjacent to the vinyl department. Analysis of these samples will be used to supplement site specific soil samples.

At four (4) locations within the vinyl department borings will be completed through the floor. Where possible this will be accomplished using available access ways. Two (2) of the borings will be completed as close as possible to the concrete wall in the subsurface room adjacent to the vinyl department. The borings will be executed with the use of a portable drill rig suitable for application in areas of limited overhead space and surface area.

The borings will be completed to a depth of 15 feet below the soil surface. Sample collection will be from six (6) inch increments on two (2) foot intervals. As previously described for Area A these samples will be collected at 0-6", 24-30", 48-54", etc., where sample recovery permits.

Two (2) composite samples will be developed from the four (4) borings at this location. The two (2) borings in the general vinyl area (B-1 and B-2) will be composited as will the borings at the basement wall (B-3 and B-4). The equal depth composites will be formed from the 0-6" increment and the six (6) inch increment above the clay layer. Analysis will be performed for USEPA Priority Pollutants less the volatile fraction on the surface sample with volatile analysis on the lower sample. Compositing will be performed in the laboratory on an equal weight basis.

The samples collected from 0-6", 48-54", 96-102", 168-174" and the six (6) inch increment above the clay layer at each boring will be individually analyzed for cadmium, mercury lead, barium and zinc.

All borings completed in the rail siding and vinyl department areas will be backfilled with bentonite or cement. This will aid in maintaining the integrity of the clay layer known to exist below these locations.

Area C - Background

(Boring designation: MW-5)

One (1) monitoring well will be installed in the parking lot. Soil sample collection depth and analytical parameters have been selected to parallel other sample locations. Soils will be collected from the top six (6) inch increment of each two (2) foot split spoon auger sample. Assuming full recovery of each split spoon the increments will be collected at 0-6", 24-30", 48-54", etc.

Analysis for U.S.E.P.A. Priority Pollutants Plus 40 less the volatile fraction will be completed on the 0-6" increment. Volatile analysis will be executed on the six (6) inch increment collected from above the clay strata. Samples collected at 48-54", 96-102" and 168-174" will be analyzed for cadmium, lead, mercury, barium and zinc.

<u>Area D - Warehouse II Yard</u>

(Boring designation: D-1, D-2)

Two (2) borings will be completed by hand auger in the Warehouse II Yard. The location of the borings will be field determined based upon slope of the yard grade, soil staining and soil accessability. The borings will be terminated at a depth of two (2) feet. Six (6) inch increments at the surface (0-6") and terminus (18-24") will be composited. The 0-6" increment will be analyzed for petroleum hydrocarbons and USEPA Priority Pollutants less the volatile fraction. Voltaile organic analysis will be performed on the 18-24" soil sample.

Area E - Loading Platforms

(Boring designation: E-1, E-2)

As previously indicated this area is used for the transfer of sealed, packaged materials only and no spills have been reported. However, the continuous vehicular use and presence of oils associated with the hydraulic loading dock may have introduced organic contaminants.

Two (2) borings will be completed by hand auger to a depth of two (2) feet below the loading docks. Analysis will be performed for petroleum hydrocarbons, lead, mercury, cadmium, barium and zinc on the 0-6" increment from each boring. The six (6) inch increments collected to the boring terminus at 24" will be retained. The necessity for analysis of the lower increments will be determined by the level of contaminants in the 0-6" sample.

Area F - Tanks TF-5 and TF-6

(Boring designation: F-1 through F-4)

Two (2) borings will be completed at both Tank TF-5 and Tank TF-6. The location of each boring will be field determined to correspond with areas of visual staining and/or points likely to receive any spills. The borings will be completed to a depth of two (2) feet in six (6) inch increments. The 0-6" increments from individual borings will be analyzed for petroleum hydrocarbons, lead, mercury, cadmium, zinc and barium. The 18-24" increment at each boring will receive volatile organic analysis.

Area G - Shed Adjacent to Underground Tanks

(Boring designation: MW-3)

Monitoring well MW-3 is proposed for completion in the gravel bed located at the shed. As previously discussed the soil samples will be collected during the course of well installation in the same manner as those at deep soil borings. Samples will be collected from the six (6) inch increment at the top of each two (2) foot spoon core continuously to the terminus of the boring. Samples will be analyzed at 0-6" for USEPA Priority Pollutants less volatiles. The volatile organic analysis will be performed on the six (6) inch increment taken above the clay layer. Samples at 48-54", 96-102" and 168-174" will be analyzed for lead, mercury, cadmium, zinc and barium.

Due to the presence of underground tanks and pipes the completion of the well at this specific location may not be feasible. A field determination will be made by a qualified geologist on the safety and advisability of proceeding with installation should an underground object be encountered. Sample collection depth will be a function of this determination.

Area H - Tanks TF-7, TF-8A and TF-8B

(Boring designation: H-1, H-2, H-3 and MW-4)

Three (3) borings will be completed by hand auger to a depth of two (2) feet below Tanks TF-7, TF-8A and TF-8B. One (1) boring will correspond with an individual tank.

The 0-6" increment at each boring will be analyzed for total petroleum hydrocarbons. In addition the 0-6" sample at Tank TF-8A will be analyzed for tripropylene glycol, the stated content of the tank.

Monitoring Well MW-4 will be installed adjacent to Tanks TF-8A and TF-8B. The depths for sample collection, increments to receive analysis and analytical parameters are identical to those indicated for borings A-1 through A-8.

Table 1 summarizes the sampling depth's increments for analysis and analytical parameters for each location.

MONITORING WELLS

On October 15 and 16, 1985 deep borings were attempted at the Nuodex, Elizabeth facility. The intent of the borings was to establish a profile of the subsurface soil strata. The location of the test borings is indicated on the attached map.

Test borings TB-1, TB-3 and Tb-4 were completed through the clay layer underlying this facility. All borings were subsequently backfilled with bentonite to assure the maintenance of the clay layer integrity. Test boring TB-2 was attempted at the shed adjacent to the underground tanks. A subsurface structure was encountered at approximately three (3) feet and drilling was terminated.

The following is a summary of well specifications for groundwater monitoring wells at the Nuodex Inc. facility, in Elizabeth, New Jersey. Based on the stratigraphic data obtained from these deep borings four (4) well locations are proposed to monitor groundwater in the areas of concern and to provide a background water sample for analysis. It is assumed that groundwater flows in a southeasterly direction toward the Arthur Kill. All wells will be constructed of schedule 40, four (4) inch diameter PVC well screen. The background well (MW-5) will be placed in the vicinity of test boring TB-1. Since groundwater was encountered at a depth of 22' below ground surface at this location, well screen will be placed from approximately 17' to 32' depth to sample the same stratigraphic zone as will be sampled in the other wells. Five (5) feet of screen will be placed above groundwater, and ten (10) feet below at each location to intercept any fluctuation in the groundwater table. A second well (MW-1) will be placed in the vicinity of TB-3, with screen placed from 21.5' to 36.5' below ground surface. A third well (MW-2) will be installed in the vicinity of TB-4, with screen placed from 25' to 40' below ground surface. Installation of a fourth well (MW-3) will be attempted in the vicinity of the fuel tanks at the east end of the facility. The fifth well (MW-4) will be located at the point of the former kerosene spill at Tank TF-8B. Screen placement at these wells will depend on the depth at which groundwater is encountered. Further investigation will be necessary prior to well installation to identify the nature of subsurface obstacles in this area.

Wells will be installed in accordance with NJDEP specifications for monitoring wells in unconsolidated formations (Figure 2). Samples collected from all wells will be analyzed for USEPA Priority Pollutants Plus 40, petroleum hydrocarbons and xylene.

New Jersey Department of Environmental Protection
Unconsol(i)dated Monitor Well (S)pecifications*

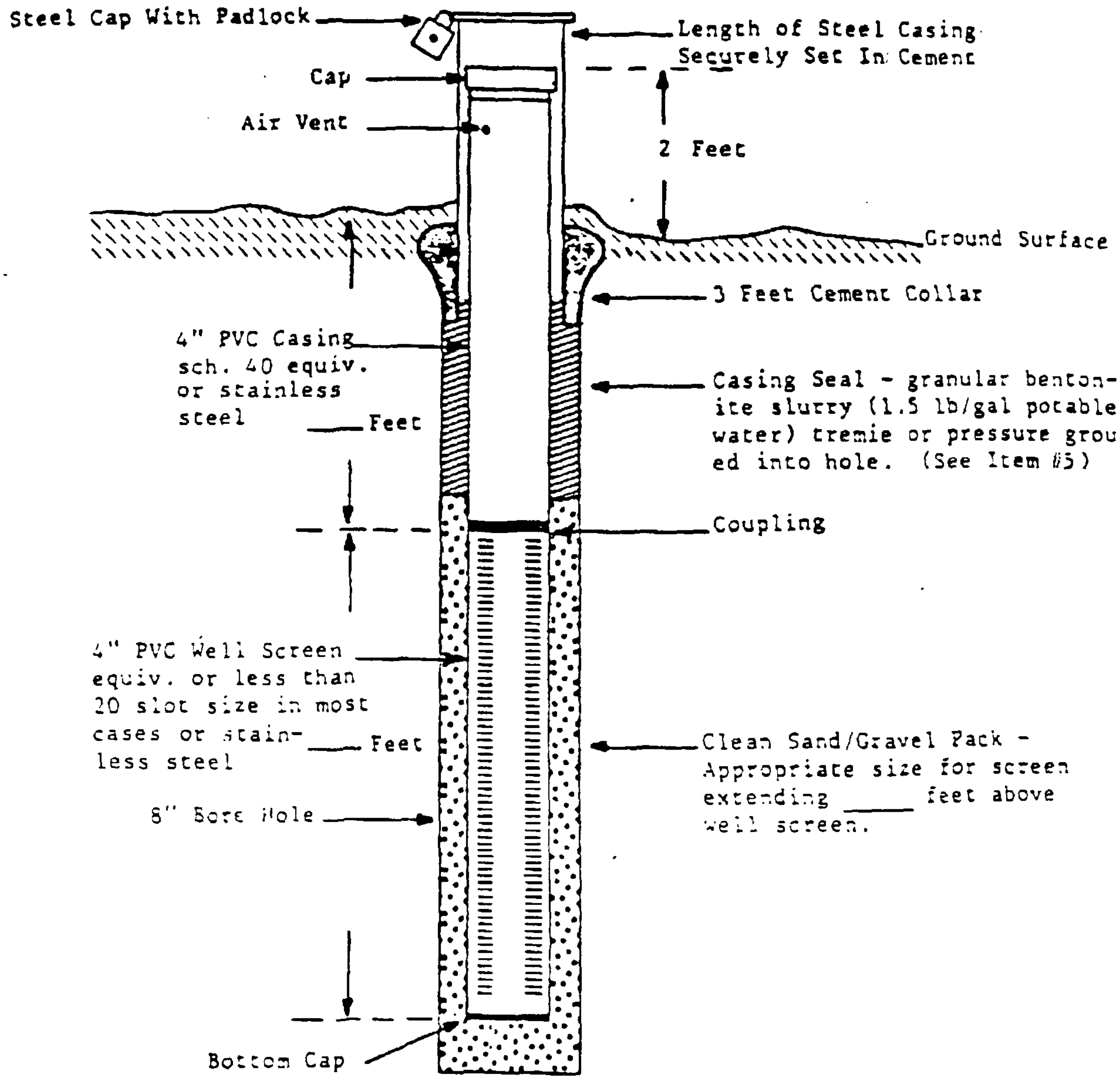


FIGURE 2

Table 1

Nuodex Inc.
Elizabeth, New Jersey

SAMPLING SUMMARY

Soil Sampling

Location	Depth of Auger Hole	Sampling Increments	Sampling Parameters
Area A: Rail Siding			
o A-4, A-6, MW-1	15'*	0-6" comp.	Priority Pollutants less volatile fraction, petroleum hydrocarbons
		Clay comp.	Volatile organics
o A-1 through A-8 MW-1, MW-2	15'*	0-6", 48-54" 96-102", 168-174", clay	Ba, Cd, Hg, Pb, Zn (0-6" petroleum hydrocarbons)
Area B: Vinyl Department			
o B-1, B-2 comp. B-3, B-4 comp.	15'*	0-6" comp.	Priority Pollutants less volatile fraction, petroleum hydrocarbons
		Clay comp.	Volatile organics
o B-1 through B-4		0-6", 48-54" 96-102", 168-174", clay	Ba, Cd, Hg, Pb, Zn (0-6" petroleum hydrocarbons)
Area C: Background			
o MW-4	*	0-6"	Priority Pollutants less volatile fraction
		Clay	Volatile Organics
		48-54", 96-102", 168"-174"	Ba, Cd, Hg, Pb, Zn

Table 1 (Cont'd)

Nuodex Inc.
Elizabeth, New Jersey

SAMPLING SUMMARY

Location	Depth of Auger Hole	Sampling Increments	Sampling Parameters
Area D: Warehouse II Yard			
o D-1, D-2	2'	0-6"	Priority Pollutants less volatile fraction, petroleum hydrocarbons
		18-24"	Volatile organics
Area E: Loading Docks			
o E-1, E-2	2'	0-6"	Petroleum hydrocarbons Ba, Cd, Hg, Pb, Zn
Area F: Tanks TF-5, TF-6			
o F-1 through F-4	2'	0-6"	Petroleum hydrocarbons Ba, Cd, Hg, Pb, Zn
		18-24"	Volatile organics
Area G: Shed at Underground Tanks			
o MW-3	*	0-6"	Priority Pollutants less volatiles, petroleum hydrocarbons
		Clay	Volatile organics
		48-54", 96-102" 168-174"	Ba, Cd, Hg, Pb, Zn
Area H: Tanks TF-7, TF-8A, TF-8B			
o H-1, H-3	2'	0-6"	Petroleum hydrocarbons
o H-2	2'	0-6"	Petroleum hydrocarbons trypropylene glycol
o MW-4	*	0-6", clay	Petroleum hydrocarbons Ba, Cd, Hg, Pb, Zn
		48-54", 96-102" 168-174"	Ba, Cd, Hg, Pb, Zn

Table 1 (Cont'd)

Nuodex Inc.
Elizabeth, New Jersey

SAMPLING SUMMARY

MONITORING WELL SAMPLING

Samples collected at all monitoring wells will be analyzed for USEPA Priority Pollutants Plus 40, petroleum hydrocarbons and total xylenes.

Notes:
1. All USEPA Priority Pollutant Analysis will include NBS/Wiley library search of the respective organic fractions, and analysis for total xylene.
2. Indication of "clay" increment refers to the 0-6" soil increment collected immediately above the clay strata.

*Monitoring well depth will be field determined.

SAMPLING METHOD AND ANALYSIS

All soil samples will be collected by hand auger or a small trailer mounted drilling rig. Six (6) inch cores and split spoon samples will be removed from the auger by turning the auger on its side and pushing the soil out with a sterilized tongue depressor. The soil will be placed on a two (2) foot square, teflon-coated benchkote pad, which will be disposed of after each use. Each core will be quartered with opposite quarters being placed into two (2) separate bottles. The bottles will be pint sized, glass containers with aluminum caps and teflon liners.

The auger will be decontaminated between samples by first brushing off any excess soil and rinsing with tap water followed by an alconox or trisodium phosphate detergent wash and deionized water rinse. Following this cleanup, the auger will be wiped with acetone and/or a 10% acid solution should samples be designated for metals analysis. Final rinse will be conducted with deionized water.

A field and travel blank will also be submitted along with the soil samples as part of Quality Assurance. The travel blank will consist of a set of sample containers filled with laboratory demonstrated analyte in the manner as the soil samples acquired that day. The field blank consists of two (2) sets of laboratory cleaned sample containers. One (1) set of containers is empty and will serve as the sample containers that will be analyzed.

The second set of containers will be filled at the laboratory with laboratory demonstrated analyte free water. At the field location, this analyte free water will be passed through clean sample equipment and placed in the empty set of sample containers for analysis.

All samples will be collected by PAS personnel. Technicians will be equipped with appropriate protective gear. N.J.D.E.P. will be notified prior to execution of sampling, and duplicate samples will be retained by PAS.

Sample bottles will be sealed and labeled on site. Detailed information on Princeton Aqua Science's Quality Control and Assurance Procedures are on file with the State of New Jersey. The Plan includes appropriate container type and preservative by analytical parameter along with reference test methods and copies of chain of custody forms. A summary of the QA/QC methods is presented in Attachment A.

Samples collected as part of this Plan will be analyzed by the methods in Table 2.

Table 2

Nuodex Inc.
Elizabeth, New Jersey

LABORATORY SAMPLE ANALYSIS

Analytical Parameter(s)	Test Method(s)
U.S.E.P.A. Priority Pollutants	Organic compound scan analysis with confirmation of all detectable organic compounds by gas chromatograph mass spectrometer (GC/MS) methodologies outlined in EPA Method 624 and 625 (F.R.: V.44, No. 233 dated 12/3/79 and revised in EPA publication 600/4-82-057 dated 7/82) and "Test Methods for Evaluating Solid Waste" U.S.E.P.A. SW846 dated 7/82. Priority pollutant metals, cyanide and total phenols analysis in accordance with "Test Methods for Evaluating Solid Waste" U.S.E.P.A. SW846 dated 7/82. Identification of organic non-priority pollutant compounds ("Plus 40") will be by forward library search of the EPA/NIH/NBS mass spectral library of the compounds of the greatest apparent concentration in each respective organic fraction (15 for purgeable fraction, 15 for base/neutral fraction and 10 for acid extractable fraction). NOTE: Substances with less than 25 percent of the internal standard will not be searched.

NOTE: One (1) in every ten (10) samples analyzed in duplicate as part of Quality Assurance.

REPORT

Upon completion of sample analysis, a summary report on the execution of this plan will be prepared. The report will include an overview of the complete field work, analytical results and Quality Control Assurance information.

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REVISED SAMPLING AND ANALYSIS PLAN ADDENDUM
FOR THE
NUODEX INC., ELIZABETH FACILITY

ECRA CASE NO. 85-374

AUGUST 1987

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1.0 INTRODUCTION

This revised addendum to the sampling and analysis plan has been prepared for the Nuodex Inc. facility located on Magnolia Avenue in Elizabeth, New Jersey. The plan has been developed based on site-specific information, including previous sampling and analysis results, the facility operational history and comments from the Bureau of Industrial Site Evaluation (BISE).

The first round of sampling and analysis has provided adequate information to identify essential items which will be incorporated into the site cleanup plan. The facility cleanup will include:

- Containment and sealing of the crawl space under the vinyl department (Area B).
- Excavation and removal of soils behind the production building (Area A). The excavation will be backfilled and capped with an impervious surface.
- Addressing areas of isolated contamination based on final cleanup levels for the site.
- Ground water remediation designed to prevent off-site migration of materials from the production area. The full vertical and horizontal extent of areas that will be influenced have yet to be determined.
- Proper treatment and discharge of ground water and stormwater.

This Revised Sampling and Analysis Plan Addendum has been written to provide necessary information for the detailed design of the remedial actions and to include additional requests stated in the New Jersey Department of Environmental Protection (NJDEP) letters dated December 4, 1986 and June 11, 1987. See Appendix A and B, respectively, for the NJDEP comment letters. The submission of this document is in accordance with the requirements of N.J.A.C. 7:1-3.7 of the Environmental Cleanup Responsibility Act (ECRA).

2.0 ENVIRONMENTAL SETTING

The environmental setting of the Nuodex Inc. site is described using available references and site specific information obtained from prior sampling and analysis. Descriptions are provided for the regional setting, site geology and site hydrogeology.

2.1 REGIONAL SETTING

The Nuodex Inc. facility in Elizabeth, New Jersey is located in an industrial area on Magnolia Avenue near U.S. Highway #1 (See Figure 1). The site is situated approximately 100 feet above mean sea level and is characterized by relatively flat topography with no more than a few feet of change in elevation across the site. The majority of the site is occupied by facility buildings.

Monthly rainfall in the area is considered uniform throughout the year, although the highest rainfall intensities are recorded in the summer months. The site annually receives an average of 44 inches of rain per year and an average of 28 inches of snow per year. The pH of the rain water is considered acidic with a pH of 4.4. The average annual temperature is 53.5°F, and the temperature ranges between average monthly extremes of 31°F in January to 76°F in July. There are approximately 190 frost-free days extending from mid-May to late October.

2.2 SITE GEOLOGY

Surficial sand, silt and fine gravel deposits up to 12 feet thick were observed in site borings and are interpreted to be fill material, although locally they are difficult to distinguish from the underlying natural materials. Permeabilities determined by Shelby-tube analysis are reported to range from 3.3×10^{-4} to 8.5×10^{-5} cm/sec. The fill material is underlain by glacial ground moraine deposits at least 30 feet thick, which consists of dense, unconsolidated, reddish-brown silt and clay with occasional thin sandy lenses and pockets of fine gravel. No distinct water table was encountered although the silt and clay deposits were damp. Vertical permeabilities determined from analysis of Shelby-tube samples are reported to range from 5.1×10^{-7} to 4.1×10^{-8} cm/sec.

A brown fine to medium-grained unconsolidated sand occurs within the silt and clay deposits at depths of 22-35 feet. The sand thickness was observed to be from 0.5 feet thick to greater than 12 feet thick from southeast to northwest, respectively. The sand was found to be wet or saturated in all cases. The silt and clay units below the sand were damp but not wet.

The red shale and sandstone of the Triassic Brunswick Formation is the bedrock unit underlying the glacial deposits. The bedrock was not encountered at the deepest boring on site and is estimated to be at a depth of between 50-60 feet.

2.3 SITE HYDROGEOLOGY

A series of five well pairs were installed at the Nuodex, Elizabeth facility in order to characterize ground water occurrence and quality. Each well pair consisted of a shallow well to 15 feet and a deep well to 30-45 feet total depth. The location of each well pair is indicated on Figure 4.

All five shallow wells were completed in the unconsolidated glacial silt and clay unit using 10 feet of PVC well screen. While drilling, dry to damp soil conditions were encountered. Following well installation, water entered the shallow wells. The northernmost well, MW-5S, was completed as a dry well and has remained dry since well installation. Shallow water elevations were recorded, contoured, and presented as perched ground water elevations. The apparent water level gradient is to the northeast, as shown in Figure 2. However, true water table conditions were not encountered, and water levels recorded in the wells most likely reflect casing storage of water slowly infiltrating from the low permeability saturated fill. The apparent gradient to the northeast is based upon lower water level elevations observed in MW-3S and MW-4S, which were installed in a concrete paved area. The lower water levels observed most likely reflect the effects of capping on fill saturation and recharge. With this observation, and in light of the inherent low permeability of the silt and clay deposits, it is difficult to assign a flow direction to the water levels observed. Further, evaluation of water levels recorded after well purging on July 8, 1986 indicates poor recovery and a significant lack of recharge in wells MW-2S and MW-4S in which the slotted well screen is located solely in the silt and clay units, as opposed to wells MW-1S and MW-3S in which the screened interval straddles both the fill and silt/clay units. This finding further suggests that the saturated fill is the source of the casing storage water observed in the shallow wells. The data obtained through installation of the automatic water level recorders proposed for this Revised Sampling and Analysis Plan Addendum will be used to evaluate recharge effects.

All five deep wells were screened in the saturated sand unit within the silt and clay deposits at depths of 22-35 feet. As noted, the sand thins from northwest to southeast ranging from greater than 11 feet thick to one foot thick, respectively. Boring logs indicate the sand was wet to saturated while the silt and clay deposits above or below were observed to be dry or damp. Static water levels recorded in the deep wells on three separate occasions were all above the top of the sand/clay interface, indicating that the system is under pressure and acting as a confined or semi-confined aquifer. The potentiometric surface contoured from the water level elevations indicates flow in an easterly-northeasterly direction, as shown in Figure 3. At this time, no relationship is ascertained between flow direction and variation in sand thickness.

3.0 AERIAL PHOTOGRAPH DOCUMENTATION

The Nuodex Inc. Elizabeth facility was originally constructed in 1940 by Mr. Leo Roon who began chemical production at the site. The property was later owned by Heyden-Newport, Inc. and Tenneco Chemicals, Inc. The facility was acquired by Nuodex Inc. in December of 1982. The Site Map provided as Figure 4 indicates the current facility layout.

The following is a discussion of selected areas of the Nuodex, Elizabeth site with emphasis on changes that have been made through the operational history of the facility. Refer to the Site Map provided as Figure 4 for the location of each area discussed and the historical aerial photographs provided as Figures 5 through 9 for documentation of the site history. Aerial photographs are provided for 1940, 1951, 1961, 1967 and 1974.

Area 1 - Production Building

The production building is located on the southern side of Magnolia Avenue. Figure 5 indicates that the main production building was under construction in 1940. The 1951 aerial photograph presented as Figure 6 indicates the facility layout during the early years of production. A parking area for the facility was located on the western side of the building in the present location of Warehouse I and outside tank storage areas are located on the eastern and western sides of the building. The boiler house on the northeast corner of the property is a separate free standing building.

The 1961 aerial photograph presented as Figure 7 indicates several additions which altered the facility to its present physical layout. Warehouse I has been constructed on the west side of the building and expansion on the east side of the warehouse has joined the boiler house to the general production building. Additional outdoor tankage has been added adjacent to Warehouse I and on the east side of the boiler house.

Figures 8 and 9, which are aerial photographs taken during 1967 and 1974, respectively, show the addition of tanks on the east side of the production building. Structural changes to the production building are not indicated in the later photographs.

Area 2 - Warehouse II

A warehouse on the northern side of Magnolia Avenue presently operates as a sorting station for raw materials and finished goods for process operations. The outside area on the western side of the warehouse has been used in the past for empty drum and material storage. The warehouse is first documented in the 1951 aerial photograph, along with the outside storage of empty drums. An addition to the warehouse, increasing its size to its present capacity, is shown in Figure 7, the 1961 photograph.

It is difficult to determine from the photographs when macadam and concrete were installed in the warehouse storage yard. Despite the presence of partially impervious surfaces, sample collection and monitor well installation in this area is included as part of this Revised Sampling and Analysis Plan Addendum.

Area 3 - Parking Lot

A parking lot area on the northern side of Magnolia Avenue has been selected for collection of background samples for site evaluation. The aerial photographs indicate that residential homes were present on this location in 1940, but by 1951 the houses had been razed. The lot has been vacant or used for employee parking since the removal of the houses.

Area 4 - Interchemical/Inmont Chemical Property Boundary

The property immediately east of the Nuodex Inc. facility production area has been used in the past for industrial operations by Interchemical Corporation which was later purchased by Inmont Chemical Corporation. The position of Nuodex Inc. is that adequate information will be available from the location of on-site monitor wells presented in this Revised Sampling and Analysis Plan Addendum to evaluate the impact of this adjacent property on the ground water. In addition, because of the past use of the adjacent property for industrial operations, monitor wells in this area are likely to be influenced by migration of constituents from the Inmont Chemical Company property rather than delineating the horizontal extent of materials from the Nuodex Inc. facility. The aerial photograph information is presented to substantiate the potential of this property as a source area.

The aerial photographs indicate that in 1940 the neighboring property was used for production or storage. The 1951 and 1961 aerial photographs indicate that the area adjacent to the Nuodex facility was used for drum storage. The 1967 photograph does not indicate the presence of obvious drums in this area. By 1974, a number of trucks were located in this area, as it was used for vehicle service and maintenance.

A map of the Elizabeth facility assembled by Tenneco Chemicals after 1960 indicates that the Interchemical property area along the eastern property boundary was the location of full drum storage and underground tanks. The drums observed in the 1961 photograph verify this information.

4.0 AREAS OF ENVIRONMENTAL CONCERN

Based on the results of the first round of sampling and analysis, on site operational history and on NJDEP concern, ten site areas have been designated at the Nuodex, Elizabeth facility for additional soil sampling. A hydrogeologic evaluation, including ground water sampling, will also be conducted to provide information to determine the possible extent of off-site migration of compounds detected in the ground water.

Analytical parameters chosen for the soil and ground water analyses have been limited to target parameters. The selected target parameters represent compounds detected above ECRA action levels in the first round of sampling and analysis.

4.1 SOIL AREAS AND SAMPLING LOCATIONS

The following is a brief description of each of the areas which have been designated for sampling at the Nuodex, Elizabeth site. Sampling locations have been chosen to effectively evaluate each area and samples below ground water depth will be excluded from analysis. Each area and sample location is identified on the site map provided as Figure 4. A summary of all sample points is provided in Table 1. Sample analytical parameters are summarized in Table 2. Analytical methodology for all sample parameters is provided in Table 3.

4.1.1 Area A - Rail Siding

The rail siding area is adjacent to the open crawl space underneath the vinyl department and extends the full length of the property. Past sampling efforts have identified polychlorinated biphenyls (PCB) in material under the vinyl department without defining horizontal extent. Metals and petroleum hydrocarbons in the Area A soils have also been identified.

The horizontal extent of PCB contamination behind the vinyl department will be evaluated with three sample locations designated 2A1 through 2A3. Samples will be collected at 0-0.5 foot and 1.5-2 foot depths. The surface samples will be analyzed for PCB content. The 1.5-2.0 foot depth samples will only be analyzed if the 0-0.5 foot samples indicate PCB concentrations greater than 5 ppm.

Three horizontal tanks, TF-16, TF-17, and the crash tank, are located approximately five feet above the grade of the rail siding. Sampling next to these tanks using a drill rig was proposed in the November 4, 1985 Revised Sampling and Analysis Plan. Due to the inability to obtain access to the area around the tanks with a drill rig, these soil samples will be collected by hand auger. A total of four sample borings next to the tanks will be executed to a total depth of 4.5 feet. Samples will be collected at 0-0.5, 2-2.5, and 4-4.5 feet and analyzed for barium, cadmium, lead, mercury, zinc and petroleum hydrocarbons. The 1.5-2 foot sample increment will be collected and analyzed for volatile organics.

Prior sampling and analysis in this area has detected concentrations of petroleum hydrocarbons and base neutrals that require further delineation. Sample locations 2A8 through 2A13 will be collected from 0-0.5 and 4-4.5 foot intervals and analyzed for petroleum hydrocarbons and base neutrals. In addition samples collected from 2A8 and 2A9 will also be analyzed for barium, cadmium, lead, mercury, and zinc.

4.1.2 Area C - Background Area

BISE utilizes the results of background soil sampling to determine if regional background values above ECRA action levels exist. The results of the first round of sampling and analysis indicate petroleum hydrocarbons and lead concentrations above ECRA action levels. Additional samples are required to determine if regional concentrations of these two parameters are above action levels or the result of the background area being used as a parking lot. Two sample locations are selected for the execution of 0-0.5 foot borings. The samples will be analyzed for lead and total petroleum hydrocarbons.

4.1.3 Area D - Warehouse II Yard

The use of this area for storage and warehousing operations is detailed in the aerial photograph documentation. Prior sampling has indicated concentrations of cadmium, lead, mercury and total petroleum hydrocarbons above ECRA action levels. To evaluate this area, three sample locations have been chosen at low lying concrete sections and seam joints. Samples will be collected for analysis below the concrete at 0.5-1 foot, 1.5-2 foot, 4-4.5 foot, 8-8.5 foot, and 14-14.5 foot intervals.

Samples from 0.5-1 foot and 4-4.5 foot intervals will be analyzed for barium, cadmium, lead, mercury, nickel and zinc. The 1.5-2 foot samples will be analyzed for petroleum hydrocarbons, metals, and volatile organics. This sample depth is being analyzed for petroleum hydrocarbons since materials from the surface macadam may affect the analytical results. If the petroleum hydrocarbon, volatile organics or metals results of the analyzed samples exceed ECRA action levels, deeper sample increments will be analyzed. Samples below ground water depth will be excluded from evaluation.

Five locations have been selected at the edge of the concrete and macadam surface in this area. Samples will be collected at 0-0.5 foot and 2-2.5 foot intervals and analyzed for target parameters that were detected above ECRA action levels in the first round of sampling and analysis. Analysis will include cadmium, lead, mercury, nickel and total petroleum hydrocarbons.

4.1.4 Area F - Tanks TF5 - TF-6

Area F contains aboveground tanks including the tanks used to pretreat the facility industrial wastewater. Prior analysis has indicated concentrations of cadmium, lead, mercury, zinc, and petroleum hydrocarbons above ECRA action levels in soil samples taken next to the tanks. Seven sample locations have been selected to evaluate the vertical extent of these materials. Samples will be collected from 1.5-2 foot and 4-4.5 foot intervals and analyzed for cadmium, lead, mercury, nickel, zinc, total petroleum hydrocarbons and volatile organics.

4.1.5 Area G - Underground Tanks

The mercury concentration in the 0-0.5 foot increment sample from the monitor well MW-3S boring was reported to be 11 ppm in the first round of sampling and analysis. Samples collected at a 4-4.5 foot interval and deeper were below ECRA action levels for mercury. Seven sample locations in the vicinity of MW-3S have been selected. The 0-0.5 foot and 2-2.5 foot interval below the surface macadam or concrete will be collected and analyzed for mercury.

The location of test boring TB-2 will also be hand dug to determine what caused auger refusal in an earlier sampling attempt.

4.1.6 Area H - Tanks TF-7, TF-8, and TF-8B

Surface samples collected from this area detected petroleum hydrocarbons above ECRA action levels. To define the vertical extent of the petroleum hydrocarbons, six boring locations have been chosen which will be sampled at 1.5-2 foot and 4-4.5 foot intervals. All samples will be analyzed for total petroleum hydrocarbons.

The mercury concentration was reported to be 23 ppm at the 8-8.5 foot sample depth at the location of MW-4S. This sample depth is below the saturated zone as indicated by the observed depths to ground water of 6 and 12 feet below the ground surface in MW-4S. The soil samples above and below the 8-8.5 foot sample are below ECRA action levels for mercury. The ground water monitoring of well MW-4S will adequately address this area, since the possible leaching or migration of any material will be detected.

4.1.7 Area I - The Cat Room

The cat room is a subsurface manufacturing area centrally located in the production building. Seepages have been observed on the walls of the cat room. The seepage is most likely locally perched ground water which is entering the room through small cracks in the wall. Past analysis of wipe samples included with the May 27, 1985 General Information and Site Evaluation Submission indicated the presence of barium, cadmium, lead, and mercury. The likely source of these materials is the crawl space under the vinyl department, which is immediately south of the cat room.

Excavation of soils under the building is not being considered and a ground water remediation program will be designed to influence shallow ground water in the cat room area. To provide definition of metals concentrations that may be present in soils adjacent to the cat room, three soil samples will be collected through the cat room wall. The samples will be collected at the height on the walls where the seepage is observed. The concrete or block walls will be drilled or chiseled to provide access to the soils. The 0-0.5 foot increment adjacent to the wall will be collected and analyzed for barium, cadmium, lead, mercury, zinc and volatile organics.

4.1.8 Area J - Benzene Storage Tank TF-9

Tank TF-9 was installed in 1980 to store benzene. In May of 1985 the tank was integrity tested and found to be tight. The installation of tank TF-9 at its present location in 1980 replaced an old benzene tank TF-9 which was known to be leaking. The old tank TF-9 was closed in place by filling with sand and capped with cement in 1981. The location of both the old and new TF-9 tanks are indicated in Figure 4, the facility site map. The known TF-9 leak of benzene prior to 1980 is considered to be the source of benzene detected in the shallow and deep monitor wells on the east side of the production building.

Soil sample 2J1 will be collected above the saturated zone and analyzed for benzene to evaluate the possible impact of the TF-9 tanks on this sample location.

To evaluate the possible extent of benzene in the soil from the old TF-9 tank, six samples, 2J2 through 2J7, will be collected around the tank by breaking through the concrete covering in the area and hand digging or hand augering to the appropriate sample depth. Samples will be collected either from above the saturated zone or the depth of the tank bottom for benzene analysis. Based on prior ground water observations from MW-3S, the depth to ground water is expected to be six to eight feet below grade.

4.1.9 Area K - East Side Tank Farm (Monitor Well MW-11S)

The possible impact of facility operations on this area will be determined with the collection of soil samples from the installation of monitor well MW-11S. Soil samples from 0-0.5 foot, 1.5-2.0 foot, 4-4.5 foot and 8-8.5 foot depths below the macadam will be collected for analysis. The 0-0.5 foot increment will be collected and analyzed for priority pollutants less volatile organics. The 1.5-2 foot increment will be analyzed for volatile organics. The remaining sample increments will be analyzed for barium, cadmium, lead, mercury and zinc. Samples below the saturated zone will be excluded from analyses.

This analysis is being conducted to screen this area to determine if further evaluation will be required. This is consistent with the approach used in prior evaluations of this site.

4.1.10 Surface Runoff and Subsurface Drain Samples

Surface runoff waters are collected in two catch basins on the east side of the production facility. During storm events, the collected wastewater is pumped to a storage tank, treated for oil and solids removal in the facility pretreatment system, then discharged to the Joint Meeting Sewerage Authority.

A subsurface drainage system was installed in 1981 to remove water from the rail siding area. This water is collected, transferred to a catch basin sump and treated prior to discharge. An access point for the collection of water from the subsurface drainage system is not available at the facility. Liquid samples from two surface catch basins, one of which includes the subsurface drainage water, will be collected and analyzed for petroleum hydrocarbons, barium, cadmium, lead, mercury and zinc.

The catch basins are small in size and contain a minimal amount of sediment. The catch basins will be cleaned out and the sediment disposed of according to state and federal guidelines. The documentation of the disposal of this material will be forwarded to the Bureau of Envionmental Evaluation Assessment and Cleanup Responsibility (BEECRA) along with the results of this Revised Sampling and Analysis Plan Addendum. This is proposed in lieu of the sampling requested by NJDEP in the letter received by Nuodex Inc. on June 11, 1987 (see Appendix B).

4.2 GROUND WATER QUALITY EVALUATION

Additional evaluation of the facility ground water will be conducted to supplement information collected in the first round of sampling and analysis. Installation of monitor wells, ground water sample analysis and gas sample analysis will be included in the ground water quality evaluation.

4.2.1 Monitor Well Locations

Based on the hydrogeologic and ground water quality data collected in the initial sampling and analysis program, ten additional ground water monitor wells will be installed at the Nuodex, Elizabeth facility. The location of each monitor well is provided in Figure 4. The additional monitor wells are located to provide further horizontal definition of the ground water quality in the shallow perched ground water and the underlying sand aquifer. The new wells will also be used to provide definition of ground water flow patterns and aquifer characteristics so that a ground water remediation program can be effectively designed.

In order to assess the extent of horizontal migration of materials in the shallow ground water, two shallow monitor wells will be installed in the northeastern corner of the site north of MW-4S and MW-4D (see Figure 4). In addition, two deep monitor wells will be installed along Magnolia Avenue in the same general vicinity to determine the extent of horizontal migration of materials in the sand aquifer. The placement of these four wells, designated MW-6S, MW-10S, MW-6D and MW-10D, is in a downgradient location for both the shallow ground water and lower sand aquifers based on the elevations in the existing monitor wells. The two shallow monitor wells MW-6S and MW-10S will be screened across the water table. Ten foot screens will be used. Two feet of screen will be above the water table and eight feet of screen will be below the water table in order to account for any fluctuations of the water table due to tidal influence.

The two deep monitor wells, MW-6D and MW-10D, will be screened across the sand stratum to determine the extent of the on-site dissolved plume in this sand layer.

Installation of a deep well MW-10 through the deep clay stratum in the vicinity of MW-10D will not be conducted at this time. During installation of MW-10D, it is proposed to drill into the lower clay which should be over 5 feet thick. Two Shelby-tube samples will be collected of the clay and analyzed for vertical permeability. It is the contention of Nuodex Inc. that the determination of the integrity of the clay layer will provide verification that the dissolved plume cannot be migrating vertically and due to the small size of the site, investigation of a deeper water bearing zone is likely to show materials originating from off-site and not from the Nuodex, Elizabeth facility. (The data collected from these new wells, supplemented by the second round of sampling of the existing site wells, will be used to define the scope of a ground water remediation program.)

The shallow monitor well designated MW-8S will be installed near the decommissioned benzene tank TF-9. Installation of this well will be complicated by the existence of the overhead piping and nearby operational tanks and pipelines. It will be necessary to hand dig or hand auger the well location to install the well casing.

The shallow well, MW-9S, will be located adjacent to tank TF-20 on the eastern property boundary. Since the exact location of underground storage tank TF-20 in this area cannot be accurately determined, nor can it be assured that shallow ground water is not disrupted due to sand fill around the tanks or tank fill lines, data collected from a well located adjacent to TF-20 would be questionable. Due to the proximity of the monitor well to Tank TF-20, it will be necessary to hand dig or hand auger the well location to install the well casing. Material concentration data will be used instead of ground water flow data to define the horizontal extent or migration of the dissolved plume in this area on site.

One well cluster of a shallow and a deep monitor well, designated MW-7S and MW-7D, will be installed in the northeastern corner of the Warehouse II yard to assess the potential impact of soils on the ground water in this area. The installation of monitor wells in this area will also provide further definition of the horizontal extent of the shallow ground water as well as additional data on ground water flow patterns in the deeper sand aquifer. A shallow well designated MW-12S will be installed in the Warehouse II yard to further assess the potential impact of soils on the ground water in this area. A shallow monitor well MW-11S will be installed in the adjacent tank farm to monitor the water table in the silt/clay for potential impacts of above ground storage.

The monitor wells proposed in this Revised Sampling and Analysis Plan Addendum are intended to efficiently define the scope of ground water remediation at the Elizabeth site. All monitor wells will be installed in accordance with NJDEP specifications, as discussed in Section 5.2, although hand augering required for installation of MW-8S and MW-9S may preclude accepted methods for backfilling around the well casings and the ability to provide definitive soil logs.

4.2.2 Monitor Well Gas Evaluation

Since its installation during the first phase of ECRA sampling and analysis, monitor well MW-3D has been generating a gas. The gas had been vented through a tube inserted through the well cap to prevent pressure build-up, but the nature and origin of the gas has not been determined. In order to evaluate the potential environmental implications and address the source of the gas, a low volume air sample will be collected from well MW-3D. The air sample will be analyzed for the volatile organics and the light hydrocarbons. Flow measurements will be taken to determine the rate of gas generation.

The gas sampling and analysis methods are discussed in Section 5.3 and the analytical methodology is referenced in Table 3.

4.3 HYDROGEOLOGIC EVALUATION

Additional field work and testing described below will be conducted to provide the hydrogeologic information necessary for remedial design. The evaluation will include continuous water elevation observations and permeability testing.

4.3.1 Automatic Water Level Recorders

In order to evaluate potential precipitation and tidal influences on the shallow ground water and the deep sand aquifer beneath the Elizabeth site, automatic water level recorders will be installed. Steven's Type F automatic water level recorders will be installed on three shallow wells and three deep wells for a period of two weeks. The continuous record of ground water level fluctuations generated by the recorders will be compared with daily precipitation and tidal cycle data for that same two week time period. Precipitation data for the Elizabeth, New Jersey weather station and tidal cycle data for the Arthur Kill will be obtained from the National Oceanic and Atmospheric Administration and the Rutgers University Department of Meteorology.

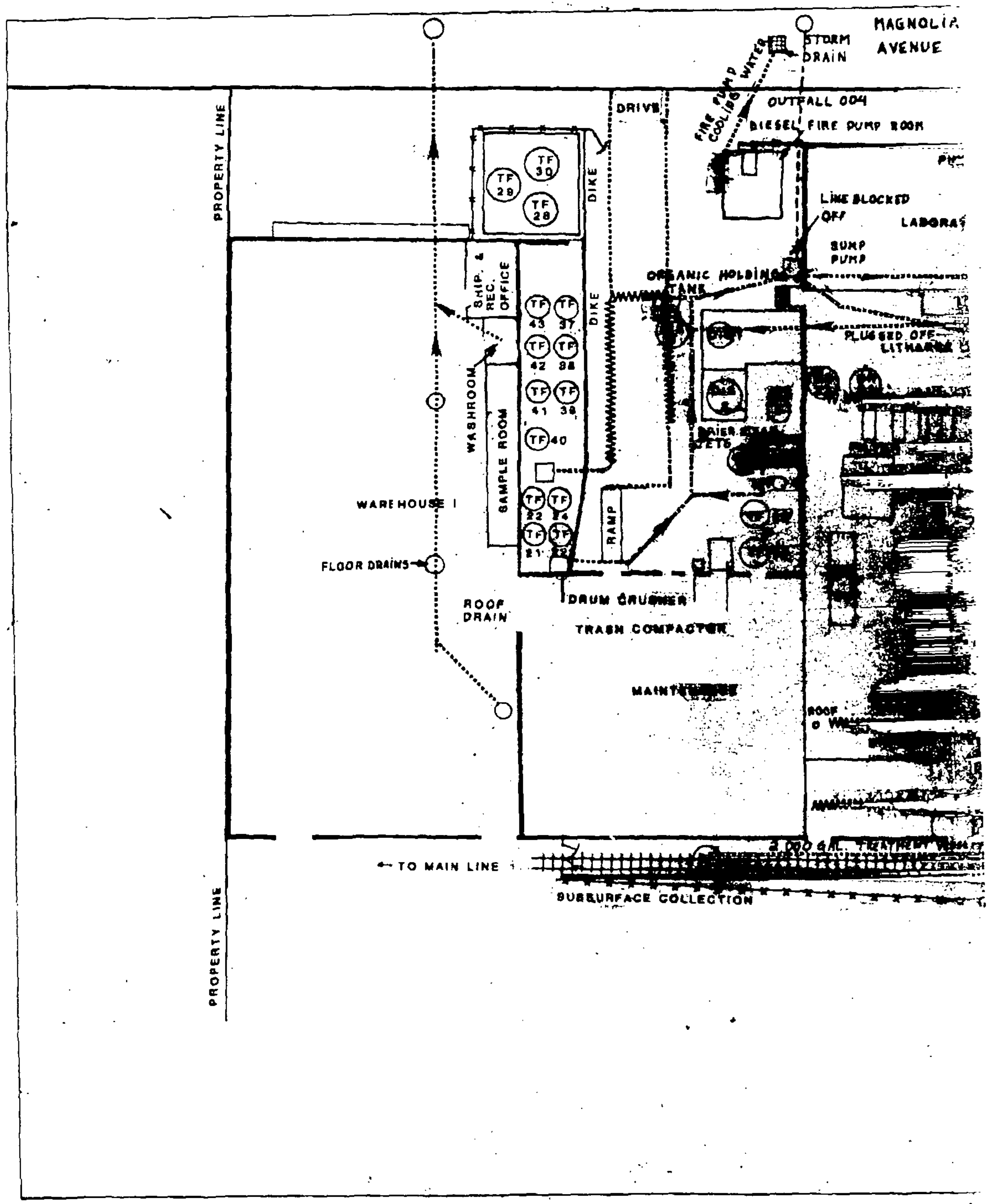
Evaluation of the data collected will be used to establish background fluctuations in ground water elevation and to assess the effect of these fluctuations on ground water gradient and flow patterns across the Elizabeth site.

4.3.2 In-situ Permeability Testing

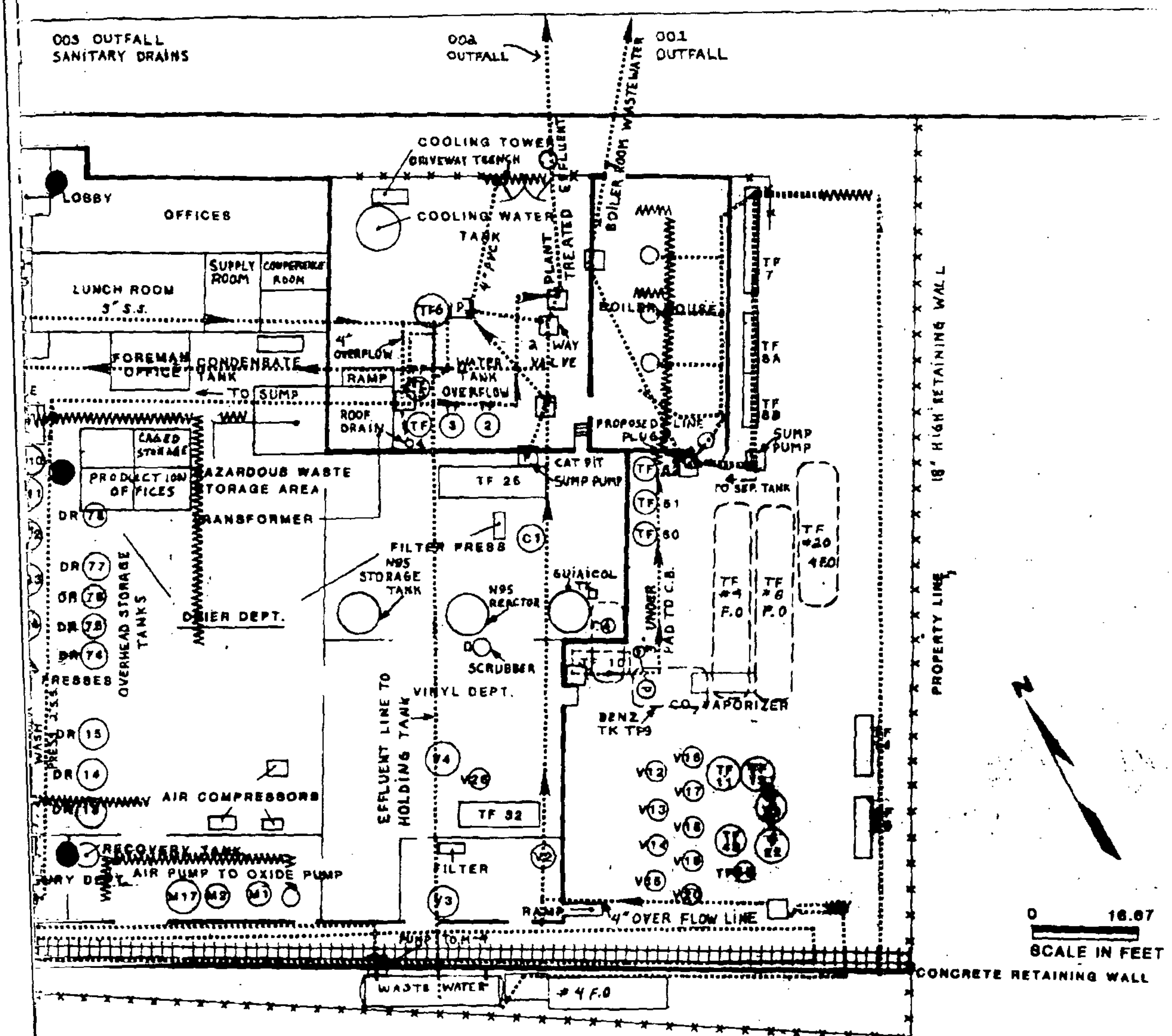
Variations in the permeability or hydraulic conductivity of soils affect the magnitude and direction of ground water flow and can result in irregularities in ground water flow paths. In preparation for the review of ground water remediation options, the hydraulic conductivity of the water bearing strata at the Elizabeth site will be determined using slug test methods.

Slug tests will be performed at several well locations in order to sufficiently define hydraulic conductivity variations across the site. The tests will be performed on the shallow and deep wells MW-1S and MW-1D, MW-3S and MW-3D, MW-6S and MW-6D, and MW-7S and MW-7D. The slug test will be performed by suddenly adding or removing a rod of known volume and observing the recovery of the water surface to its original level. The resultant data will be used to calculate horizontal hydraulic conductivity in the fill material and in the lower water-bearing sand.

In addition to the single well slug tests, small scale drawdown tests will be performed at two or three well locations to evaluate the hydraulic communication between the shallow ground water and the lower sand aquifer. The deep well of the well cluster will be pumped at a constant rate and the water level in the adjacent shallow well and the surrounding deep and shallow wells will be measured. The duration of each drawdown test will depend on the observed response in the observation wells, but will be limited to a maximum of eight hours. The data collected from these small scale tests will be used to evaluate potential migration routes as well as efficiently design a program of aquifer remediation.



MAGNOLIA AVENUE
STORM DRAIN
FIRE PUMP COOLING WATER
OUTFALL 004
DIESEL FIRE PUMP ROOM
DRIVE
PROPERTY LINE
TF 30
TF 29
TF 28
DIKE
LINE BLOCKED OFF
SUMP PUMP
ORGANIC HOLDING TANK
SHIP. & REC. OFFICE
TF 43
TF 37
TF 42
TF 41
TF 40
TF 22
TF 21
WASHROOM
SAMPLE ROOM
PLUGGED OFF
RAMP
WAREHOUSE I
FLOOR DRAINS
ROOF DRAIN
DRUM CRUSHER
TRASH COMPACTOR
← TO MAIN LINE
SUBSURFACE COLLECTION
PROPERTY LINE



LEGEND:

ww SURFACE DRAIN

---- UNDERGROUND TANK

...... ACTUAL EFFLUENT DRAINS AND TREATMENT SYSTEM

|||||| PROPOSED MODIFICATION FOR EAST TANK FARM

FIGURE

SUBSURFACE DRAIN AND SEWI
SCHEMATIC

NUODEX INC.
ELIZABETH N.J. FACILITY

OCTOBER 1986

959270381

5

CLEANUP PLAN

HULS AMERICA INC.
ELIZABETH, NEW JERSEY
ECRA CASE NO. 85374

PREPARED FOR:

HULS AMERICA INC.
2 TURNER PLACE
PISCATAWAY, NEW JERSEY 08855-0365

PREPARED BY:

IT CORPORATION
165 FIELDCREST AVENUE
EDISON, NEW JERSEY 08837

JULY 1989

PROJECT NO. 529051

ENG/KD585-rpt

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(Bound Separately)

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1.0 INTRODUCTION

This document presents the Cleanup Plan for the Hüls America Inc. (Hüls) facility in Elizabeth (Union County), New Jersey. This plan has been prepared pursuant to the New Jersey Environmental Cleanup Responsibility Act (ECRA) and letters dated August 19, 1988 and May 9, 1989 from the New Jersey Department of Environmental Protection (NJDEP).

This Cleanup Plan is based on the results of sampling and analyses which were conducted in two phases and reported in separate documents dated September 3, 1986 and March 30, 1989. The results of these two investigations have been previously submitted to the NJDEP and are further summarized in Sections 4.0 and 5.0. The proposed cleanup activities, remedial levels , cost estimate and schedule are presented in Section 6.0, 7.0, 8.0 and 9.0, respectively.

This Cleanup Plan is also based on the results of a Public Health Risk Assessment completed for the Elizabeth site. The Risk Assessment is presented in Attachment 1, and the results indicate that the risks associated with the site after the Cleanup Plan is implemented are within acceptable limits. Attachment 2 is a scaled survey of the site.

2.0 ENVIRONMENTAL SETTING

The site is located in an industrialized area of the City of Elizabeth in Union County as shown in Figure 1. The facility consists of two buildings, two storage tank areas, a yard area, and a parking lot as shown in Figure 2.

2.1 GEOLOGIC SETTING

The city of Elizabeth is situated in Piedmont Plateau Physiographic Province in New Jersey. The Piedmont consists of gently rolling topography which slopes from the New Jersey Highlands Region to the Coastal Plain. The lowlands topography within the Piedmont is interrupted by a series of ridges. The ridges result from the more resistant sedimentary and igneous rocks which are a part of the geologic development of this area. Elizabeth lies on the eastern edge of this area in a broad flat plain with the southern end of Newark Bay to the east.

2.1.1 Local Geology

The area is underlain by up to 200 feet of reddish brown, clay, sand, and gravels, which form the ground moraine deposited during the last glaciation. The Brunswick Formation of the Newark Group underlies the ground moraine. The Brunswick Formation consists of reddish brown thin-bedded shales, mudstones, and sandstones which form the major aquifer in Union County. The Brunswick Formation has a regional strike of N 50°E and dips to the northwest at 9 to 13 degrees. Based upon published reports, the Brunswick formation is encountered at depths of 20 to 100 feet below the surface and has a thickness of 6000 to 8000 feet.

2.1.2 Site Geology

The surficial soils at the site consist of dense silty clays and clayey silts with some gravel. These soil types are consistent at the facility and are typically associated with the ground morine deposits in this part of Union County.

At depths of 20 to 30 feet below the surface a brown silty, coarse to fine sand is encountered. Based on the soil borings installed during the two phases of sampling and analysis at this site, the sand forms what is assumed to be a continuous sand lens that is located within the glacial till. The total thickness of this sand layer ranges from 1 to greater than 10 feet.

2.2 GROUNDWATER OCCURRENCE

Ground water occurs under various conditions at the Hüls Elizabeth site. The following sections describe the principal hydrogeologic settings in which ground water is found.

2.2.1 Shallow Saturated Zone

The shallow saturated zone occurs within the first 20 to 30 feet of soil beneath the site which consists of unconsolidated deposits of silty clay to clay silt containing minor quantities of sand and gravel. Ground water occurs in this material as the result of the saturation of these low permeability materials over time. Laboratory tests conducted on soil samples indicated a vertical permeability ranging from 1.0 x 10^{-7} to 1.0 x 10^{-8} cm/sec.

Slug tests conducted within wells installed in this zone have horizontal hydraulic conductives ranging from 2.0 x 10^{-4} cm/sec to 3.0 x 10^{-4} cm/sec.

The variability within this zone to contain or transmit water is evidenced by two dry wells which have been installed during investigative phases at the Hüls facility.

2.2.2 Deep Sand Layer

At depths of 20 to 30 feet below the surface a silty, coarse to fine sand is encountered. The sand layer varies in thickness from 1 to greater than 10 feet and is believed to be continuous sand lens of which the areal extent is unknown. Ground water occurs within the sand as a result of the slow percolation of water from the overlying silts and clays.

Ground water occurs within the sands under confined or semi-confined conditions. Horizontal hydraulic conductivity values range from 5.0 x 10^{-4} cm/sec to 5.0 x 10^{-5} cm/sec in the deeper sand layer.

2.2.3 Bedrock Aquifer

The Brunswick formation is the major aquifer underlying the Hüls facility. Water occurs in the Brunswick formation as a result of secondary porosity caused by fractures and joints within the rock. Ground water occurs under both confined and semi-confined conditions within the Brunswick formation depending upon the thickness and type of overlying sediments.

The contact between the glacial unconsolidated deposits and the Brunswick formation is estimated to be 65 to 80 feet below the surface of the site.

3.0 FACILITY OPERATIONS

3.1 PRODUCTION OPERATIONS

The majority of the products made at the Elizabeth facility are classified as metal soaps. These are produced by the reaction of a metal oxide or hydroxide with an organic acid.

$$M(OH)_2 \quad + \quad 2RCOOH \quad = \quad M(HOOC)_2 \quad + \quad 2H_2O$$

These soaps are used as driers for paints, catalysts, fuel oil additives, PVC stabilizers and fungicides. The metals currently used at Elizabeth include cobalt, zirconium, calcium, zinc, copper, manganese, nickel, bismuth and potassium. The primary organic acid utilized is naphthenic acid. The reaction is carried out in a solvent medium using either mineral spirits or hi-flash naphtha. Certain other chemicals are used to keep the soaps in solution, control viscosity and adjust specific gravity.

The plant also has its own boiler house to provide steam for process use and building heat. It has three 250 HP oil-fired boilers.

Warehouse II is located on the north side of Magnolia Avenue and is used to store raw materials, nonflammable finished goods and operating supplies. The yard of Warehouse II is used to store drums of spent solvent for recycling or incineration, off-grade products and flammable raw materials.

Additional detailed process information is contained in Appendix III of the general information and site evaluation submissions for the Environmental Cleanup Responsibility Act (ECRA) submitted to the NJDEP on May 27, 1985.

3.2 AREAS OF CONCERN

Based upon historical use and current operations, the following areas of concern were identified:

Area A - Railsiding

Area B - Vinyl Department Crawl Space

Area C - Parking Lot (Background)

Area D - Warehouse II

Area F - Aboveground Tanks TF-5 and TF-6

Area G - Underground Tanks TF-4, TF-6 and TF-20

Area H - Aboveground Tank TF-7, TF-8A and TF-8B

Area I - Cat Room

Area J - Abandoned Underground Benzene Tank TF-9

Area K - West Tank Farm

4.0 SAMPLING ACTIVITIES

Two phases of sampling have been completed at the Hüls Elizabeth site (Figure 2). Soil and ground water sampling executed during the Phase I investigation was performed to screen for the presence or absence of metals or organic compounds in various areas at the facility. Once the presence of materials was confirmed, a Phase II sampling program was undertaken to define the extent of the metals and organic compounds. The two phases of sampling identified areas where the soil contained petroleum hydrocarbons, metals, and volatile organic compounds. The two sampling phases also identified the presence of volatile organic compounds in ground water beneath the site. Results of the Phase I and Phase II sampling programs were presented in "Results of Sampling and Plan for Compliance with the Environmental Cleanup Responsibility Act (ECRA)" and "Results of Phase II Sampling, Analysis, and Hydrogeological Assessments" submitted to the NJDEP in September 1986 and April 1989, respectively.

4.1 SOIL SAMPLING SUMMARY

The following sections summarize the soil sampling activities conducted at the Hüls Elizabeth site. Analytical results from the sampling activities are summarized in Section 5.0 and in the two reports previously referenced.

4.1.1 Phase I Investigation

A total of 25 soil borings were drilled during the initial investigation to provide information on the presence of metals, petroleum hydrocarbons, and organic compounds in the soil within the Elizabeth facility. Table 1 provides a summary of the borings by area of concern, total depths, and increments sampled within the borings.

Soil samples from Area A were analyzed for Total Petroleum Hydrocarbons (TPH), barium, cadmium, lead, mercury, and zinc. Additionally, selected sample increments were also analyzed for USEPA priority pollutant volatile organics (including NBS library searches) and total xylenes.

TABLE 1

SOIL SAMPLES AND ANALYTICAL PARAMETERS FROM PHASE I INVESTIGATION

HULS AMERICA INC.
ELIZABETH, NEW JERSEY

Location	Number of Borings	Total Boring Depth (feet)	Sample Increments (feet)	Analytical Parameters
Area A - Railsiding	6	14.5	0-0.5, 2.0-2.5, 4.0-5, 8.0-8.5, 14.0-14.5	TPH, barium, cadmium, lead, mercury, and zinc.
	2	14.5	0-0.5, 4.0-4.5, 8.0-8.5, and 14-14.5	TPH, barium, cadmium, lead, mercury, and zinc.
			2.0-2.5	TPH, barium, cadmium, lead, mercury, zinc, PP VOC +15, and Total Xylenes.
	1 (Monitor Well MW-15 boring)	N/A	0-0.5, 8.0-8.5, and 14-14.5	TPH, barium, cadmium, lead, mercury, and zinc.
			4.0-4.5	TPH, barium, cadmium, lead, mercury, zinc, PP VOC+15, and total xylenes.
	1 (Monitor Well MW-25 boring)	N/A	0-0.5, 4.0-4.5 8.0-8.5, and 14-14.5	TPH, barium, cadmium, lead, mercury, and zinc.
Area B - Vinyl Crawl Space	4	14	0-0.5, 2-2.5, 4.0-4.5 8.0-8.5, and 13.5-14.0	TPH, cadmium, lead, mercury, and zinc (one increment was analyzed for PPVOC+15)

TABLE 1 (Continued)

SOIL SAMPLES AND ANALYTICAL PARAMETERS FROM
PHASE I INVESTIGATION

HULS AMERICA INC.
ELIZABETH, NEW JERSEY

Location	Number of Borings	Total Boring Depth (feet)	Sample Increments (feet)	Analytical Parameters
Area C - Background	1 (Monitor Well MW-5S boring)	N/A	0-0.5	Priority pollutant compounds (less VOC) and TPH.
			2.0-2.5	PPVOC+15, barium, cadmium, lead, mercury, zinc, and TPH.
			4.0-4.5, 8.0-8.5 and 14-14.5	Barium, cadmium, lead, mercury, zinc, and TPH
Area D - Warehouse II	2	2.0	0-0.5	TPH, and priority pollutant compounds (less VOC) (composite of 2 samples)
			1.5-2.0	PPVOC+15
Area F - Tanks TF-5 and TF-6	4	2.0	0-0.5	TPH, barium, cadmium, lead, mercury and zinc.
			1.5-2.0	PPVOC+15
Area G - Underground Tanks	1 (Monitor Well MW-3S boring)	N/A	0-0.5	TPH and priority pollutants compounds (less VOC)
			2.0-2.5	PPVOC+15 and total xylenes
			4.0-4.5, 8.0-8.5, and 14-14.5	Barium, cadmium, lead, mercury, and zinc.

TABLE 1 (Continued)

SOIL SAMPLES AND ANALYTICAL PARAMETERS FROM
PHASE I INVESTIGATION

HULS AMERICA INC.
ELIZABETH, NEW JERSEY

Location	Number of Borings	Total Boring Depth (feet)	Sample Increments (feet)	Analytical Parameters
Area H - Tanks TF-7, TF-8A, and TF-8B	43	0.5	0-0.5	TPH
	1 (Monitor Well MW-4s boring)	N/A	0-0.5	TPH, barium, cadmium, lead, lead, mercury, and zinc.
			4.0-4.5, 8.0-8.5, and 14-14.5	Barium, cadmium, lead, mercury, and zinc.

Soil samples from Area B, beneath the Vinyl Department, were submitted for analysis of TPH, barium, cadmium, lead, mercury, and zinc. One sample from each boring was analyzed for priority pollutant volatile organic compounds, including NBS library searches. Additionally, surface samples were composited and analyzed for TPH and priority pollutants less the volatile organic fraction.

Soils from Area C, the background area across Magnolia Avenue, were submitted for analysis of TPH, barium, cadmium, lead, mercury and zinc. One sample from the boring was analyzed for priority pollutant volatile organic compounds, including NBS library searches.

Shallow soil samples from Area D, the Warehouse II yard, were submitted for TPH and the full priority pollutant (less volatile organic fraction) analysis. The 1.5 to 2.0 foot increment in those borings were submitted for priority pollutant volatile organic analyses including NBS library searches.

Shallow soil samples from Area F, Tanks TF-5 and TF-6, were sampled and analyzed as outlined in the preceding section for Area D.

The surface soil sample collected from Area G boring was analyzed for TPH and full priority pollutant list compounds (less volatile organic compounds). Volatile organic compound analysis, including NBS library searches, was performed on the 2.0 to 2.5 foot increment from the boring. Remaining increments were analyzed for barium, cadmium, lead, mercury and zinc.

Surface soil samples from borings in Area H, Tanks TF-7, TF-8A and TF-8B, were analyzed for TPH. Additional parameters and samples were collected in one of the borings. The added parameters were barium, cadmium, lead, mercury, and zinc.

4.1.2 Phase II Investigation

A total of 39 soil borings were drilled during the Phase II investigation to confirm previous results and assist in the delineation of areas of concern within the site. Tables 2 and 3 provide a summary of the borings by area of concern, total depths, and sampled increments within the borings, and parameters analyzed.

Area A, the railsiding area, is south of the open crawl space underneath the Vinyl Department and extends the full length of the property. Within the general area of the railsiding, a Conrail spur track from the adjacent conrail enters the property from the east and runs adjacent to the main processing building. Past sampling efforts had identified polychlorinated biphenyls (PCB) in material under the Vinyl Department. Metals and petroleum hydrocarbons in the Area A soils have also been identified. With the potential for the area below the Vinyl Department to function as a source for PCBs. The horizontal extent of PCBs in Area A was evaluated with three sample locations. Samples were collected at 0-0.5 feet and analyzed for PCB content.

Three horizontal aboveground tanks, TF-16, TF-17 and the spill control tank are located approximately five feet above the grade of the railsiding spur. A total of four soil borings next to the tanks were executed to a total depth of 4.5 feet. Samples were collected at 0-0.5, 2-2.5, and 4-4.5 foot intervals and analyzed for barium, cadmium, lead, mercury, zinc and total petroleum hydrocarbons. Also the 1.5-2 foot sample increment was collected and analyzed for volatile organics.

Prior sampling and analysis in this area had detected concentrations of petroleum hydrocarbons and base neutrals in the rail siding that required further delineation. Samples were collected from 0-0.5 and 4-4.5 foot intervals and analyzed for petroleum hydrocarbons and base neutrals. Additional samples collected from two borings were also analyzed for barium, cadmium, lead, mercury, and zinc.

TABLE 2

SOIL SAMPLE INFORMATION FROM
PHASE II INVESTIGATION

HULS AMERICA INC.
ELIZABETH, NEW JERSEY

Sample Points	Maximum Sample Depth (feet)	Sample Increments (feet)	Sample for Analysis[a] (feet)
2A1-2A3	2	0-0.5, 1.5-2	0-0.5 1.5-2 if surface sample are above 5 ppm PCB
2A4-2A7	4.5	0-0.5, 1-1.5, 2-2.5, 4-4.5	0-0.5, 1-1.5, 2-2.5, 4-4.5
2A8-2A13	4.5	0-0.5, 2-2.5, 4-4.5	0-0.5, 2-2.5, 4-4.5
2A8-2A9	4.5	0-0.5, 4-4.5	0-0.5, 4-4.5
2C1-2C2	0.5	0-0.5	0-0.5
2D1-2D3	14.5	0-5-1, 1.5-2, 4-4.5, 8-8.5, 14-14.5	0-5-1, 1.5-2, 4-4.5 samples below ground water depth will be excluded and deeper samples will be analyzed if surface samples exceed ECRA action levels.
2D4-2D8	2.5	0-0.5, 2-2.5	0-0.5, 2-2.5
2G1-2G7	2.5	0-0.5, 2-2.5	0-0.5, 2-2.5
2H1-2H6	4.5	1.5-2, 4-4.5	1.5-2, 4-4.5
2I1-2I3	at depth of seepage	--	0-0.5 next to subsurface wall.
2J1-2J7	above saturated zone	--	Above saturated zone
2K1		0-0.5, 1.5-2, 4-4.5, 8-8.5	0-0.5, 1.5-2, 4-4.5 samples below ground water depth will be excluded from analysis.

a) Samples below ground water depth will be excluded from analysis.

TABLE 3

SOIL SAMPLE ANALYTICAL PARAMETERS
PHASE II INVESTIGATION

HULS AMERICA INC.
ELIZABETH, NEW JERSEY

Sample Points	Sample Depth (feet)	Sample Type	Analytical Parameter
2A1-2A3	0-0.5	Soil	Polychlorinated biphenyls (PCBs)
2A4-2A7	0-0.5, 2-2.5, 4-4.5	Soil	Barium, cadmium, lead, mercury, zinc, and total petroleum hydrocarbons
2A4-2A7	1-1.5	Soil	Volatile organics[a]
2A8-2A13	0-0.5, 4-4.5	Soil	Base Neutrals[a] and total petroleum hydrocarbons
2A8-2A9	0-0.5, 4-4.5	Soil	Barium, cadmium, lead, mercury, and zinc
2C1-2C2	0-0.5	Soil	Lead and total petroleum hydrocarbons
2D1-2D3	0.5-1, 4-4.5	Soil	Barium, cadmium, mercury, lead, nickel and zinc
2D1-2D3	1.5-2	Soil	Barium, cadmium, lead, mercury, nickel, zinc, total petroleum hydrocarbons and volatile organics[a]
2D4-2D8	0-0.5, 2-2.5	Soil	Cadmium, lead, mercury, nickel, and total petroleum hydrocarbons
2G1-2G7	0-0.5, 2-2.5	Soil	Mercury
2H1-2H6	1.5-2, 4-4.5	Soil	Total petroleum hydrocarbons
2I1-2I3	0-0.5 (lateral)	Soil	Barium, cadmium, lead, mercury, zinc and volatile organics[a]

TABLE 3
(Continued)

SOIL BORING INFORMATION
PHASE II INVESTIGATION

HULS AMERICA INC.
ELIZABETH, NEW JERSEY

2J1-2J7	Above saturated zone	Soil	Benzene
2K1	0-0.5	Soil	Priority pollutants less volatile organics
	2-2.5		Volatile organics
	4-4.5, 8-8.5		Barium, cadmium, lead, mercury, and zinc

[a] Organic analysis includes priority pollutants and NBS library searches.

[b] Metals analysis on liquid samples will follow EPA protocol. Ground water samples will be field filtered and analyzed for soluble metals. Catch basin samples will be analyzed for total metals as they are indicative of potential wastewater discharge.

observed. Holes were drilled through the concrete walls to provide access to the soils. The 0-0.5 foot increment adjacent to the wall was collected and analyzed for barium, cadmium, lead, mercury, zinc and volatile organics.

A soil sample was collected from above the saturated zone in Area J, the abandoned benzene storage tank, and analyzed for benzene to evaluate the possible impact of the TF-9 tank. Six additional samples were collected from around the tank by breaking through the concrete surface and hand augering. Samples were collected either from above the saturated zone or at the depth of the tank bottom, and analyzed for benzene.

Soil samples from the 0-0.5 foot, 1.5-2.0 foot, 4-4.5 foot and 8-8.5 foot intervals below the macadam and concrete were collected for analysis from Area K, the West Side Tank Farm The 0-0.5 foot increment was collected and analyzed for priority pollutants less volatile organics. The 1.5-2 foot increment and analyzed for volatile organics and the remaining sample increments were analyzed for barium, cadmium, lead, mercury and zinc analysis.

4.2 GROUND WATER SAMPLING SUMMARY

4.2.1 Monitor Well Installation

A total of 21 monitor wells have been installed at the Elizabeth facility. Ten wells were installed in June of 1986 and 11 were installed in December of 1989. All monitor wells were installed in accordance with NJDEP specifications for Unconsolidated Monitor Wells. Table 4 summarizes the monitor well construction details for these wells. Split-spoon sampling was conducted continuously during installation of the monitor wells to lithologically characterize the soils.

4.2.2 Ground Water Sampling

Two complete rounds of ground water sampling were completed on July 7, 1986 and December 28 and 29, 1989. Prior to sampling, each well was purged of three well volumes or until dry in accordance with NJDEP guidelines. Each well was sampled using either a Teflon™ or stainless steel bailer. A TABLE 4

TABLE 4
MONITOR WELL CONSTRUCTION DETAILS

HÜLS AMERICA INC., ELIZABETH FACILITY
ELIZABETH, NEW JERSEY

MONITOR WELL DESIGNATION	WELL DIAM. (inches)	TOTAL WELL DEPTH (feet)	DEPTH TO TOP OF SCREEN (feet)	SCREEN LENGTH (feet)	SCREEN SIZE (inches)
MW-1S	4	15	5	10	0.020
MW-1D	4	45	35	10	0.020
MW-2S	4	15	5	10	0.020
MW-2D	4	30	25	5	0.020
MW-3S	4	15	5	10	0.020
MW-3D	4	30	25	10	0.020
MW-4S	4	15	5	10	0.020
MW-4D	4	37	27	10	0.020
MW-5S	4	15	5	10	0.020
MW-5D	4	33	23	10	0.020
MW-6S	4	18	8	10	0.020
MW-6D	4	30	20	10	0.020
MW-7S	4	16	6	10	0.020
MW-7D	4	34	29	5	0.020
MW-8S	2	10	2	8	0.020
MW-9S	2	16	6	10	0.020
MW-10S	4	18	8	10	0.020
MW-10D	4	30	20	10	0.020
MW-11S	4	18	8	10	0.020
MW-11D	4	30	20	10	0.020
MW-12S	4	18	8	10	0.020

laboratory decontaminated bailer was used at each well location in order to eliminate cross-contamination. All water samples were collected in appropriate containers and properly labeled at the field location. All samples were identified on the chain of custody forms which were transported to the laboratory with the samples. All ground water samples were analyzed in accordance with the analytical schedules described in the Phase I "Sampling and Analysis Plan" or the Phase II "Sampling and Analysis Plan Addendum".

5.0 DISCUSSION OF ANALYTICAL RESULTS

This section summarizes the findings of the sampling and analysis conducted during the two investigation phases conducted at the Hüls Elizabeth facility. A detailed discussion of the results are contained in the Phase I and Phase II Investigation Results Reports dated September 3, 1986 and March 29, 1989, respectively.

5.1 SOIL SAMPLING

5.1.1 Area A - Rail Siding

The soils collected in Area A, the rail siding, during the Phase I investigation contained barium, cadmium, lead, mercury, and zinc. In general, metal concentrations decreased with depth, although this was not observed for every boring. Petroleum hydrocarbons were also detected in surface samples from this area at levels ranging from 37 to 24,000 ppm.

Three samples were collected along the north side of the rail spur in the Phase II investigation to evaluate the potential impacts of materials originating from the crawl space below the Vinyl Department. PCBs and priority pollutant and nonpriority pollutant base neutral organic compounds were detected. These findings are consistent with data from samples collected through the floor of the Vinyl Department in the Phase I investigation.

Four samples were collected to evaluate the area surrounding the three aboveground storage tanks (TF-16, TF-17 and the spill control tank) on the southeast side of the rail siding. Barium, cadmium, lead, mercury, and zinc were detected in all samples. Mercury and zinc were consistently detected above the ECRA action levels. Petroleum hydrocarbon concentrations in this area ranged from below the 100 ppm ECRA action level to 8400 ppm. Thos data demonstrates an inconsistent pattern of vertical distribution of petroleum hydrocarbons in this area.

Six samples were collected along the rail spur to confirm previous results and assist in the delineation of this area. Two samples at the southwestern end of the spur contained cadmium, lead, mercury and zinc above the ECRA action levels. All metals in these samples showed sharp concentration reductions with depth to the sampled depth of 4.5 feet. Petroleum hydrocarbons ranged between 64 ppm and 200 ppm in the borings. Total base neutral concentrations, consisting chiefly of benzo(b)fluoranthene and pyrene, ranged from 1.9 ppm to 1.2 ppm. The remaining samples in this area contained petroleum hydrocarbon concentrations ranging from 33,000 ppm to nondetectable concentrations ranging from 33,000 ppm to nondetectable, with the borings indicating a sharp decline in concentration with depth. A petroleum hydrocarbon concentration of 33,000 ppm was detected in one surface sample.

Base neutral compounds were detected in the shallow increments (0-0.5 foot) in two borings, however, only 1.6 ppm bis(2-ehylhexyl)phthalate was detected the deeper increment and may be the result of laboratory contamination.

5.1.2 Area B - Vinyl Department Crawl Space

During the Phase I Investigation, four soil borings were completed through the floor of the Vinyl Department into the soils underlying the crawl space beneath the building. Soil samples from these borings were collected, and analytical results indicated the presence of metals and organic compounds. Surface samples contained petroleum hydrocarbons, metals, priority pollutant acid extractables and base neutrals above ECRA action levels.

Two of the borings indicated levels of mercury and cadmium above ECRA action levels at the deepest sample increment of 13.5 to 14 feet. The other two borings also contained concentrations of the metals near or below ECRA action levels at the 13.5 to 14 foot depth. A composite sample of surface soils contained PCB 1248 at 550 ppm.

5.1.3 Area C - Background

One boring (from MW-5S) was installed in Area C, the background area, during the Phase I investigation. Surface soil samples from this boring contained petroleum hydrocarbons, lead, and mercury above ECRA action levels. Remaining sample increments from the boring indicated no metals or compounds exceeding ECRA action levels.

Surface soil samples collected from Area C during the Phase II investigation contained petroleum hydrocarbons and lead above the ECRA action level, which is consistent with the Phase I sampling results.

5.1.4 Area D - Warehouse II Yard

Composite surface samples collected in the Phase I investigation from Area D, the Warehouse II yard, contained petroleum hydrocarbons, cadmium, lead, and mercury above ECRA action levels. Deeper samples collected for volatile organics analysis contained no detectable levels of these organic compounds.

Soil samples analyzed during the Phase II investigation contained petroleum hydrocarbons, cadmium, lead, mercury, and nickel at concentrations above ECRA action levels at various locations and depths. Boring 3D-2 was the only location where volatile organic compounds consisting of benzene at 0.65 ppm and toluene at 0.46 ppm and 0.18 ppm.

5.1.5 Area F - Aboveground Tanks TF-5 and TF-6

A total of four soil borings were installed in Area F during the Phase I investigation. Surface soil samples from these borings contained petroleum hydrocarbons, cadmium, lead, and mercury above ECRA action levels. Priority pollutant volatile organic compounds were detected in two locations: F-1 above ECRA action levels, and F-3 below ECRA action levels.

No soil samples were collected from Area F during the Phase II investigation due to inaccessibility of the proposed boring locations and the presence of underground electrical conduit.

5.1.6 Area G - Underground Tanks TF-4, TF-6 and TF-20

Area G samples collected during the Phase I investigation were proximate to underground tanks during installation of monitoring well 3S. ECRA action levels were exceeded in the surface sample and the 4-4.5 foot increment sample for mercury. All other analytical results were below ECRA action levels. Mercury concentrations in soil samples collected during the Phase II investigation from the underground storage tank area (Area G) ranged from 83 ppm to 3000 ppm.

5.1.7 Area H - Tanks TF-7, TF-8A and TF-8B

Phase I investigation surface sample locations collected in Area H contained petroleum hydrocarbons above ECRA action levels. Mercury was detected in one sample from the MW-4S soil boring location at 23 ppm at an 8-foot depth. All other analyses were below ECRA action levels.

Petroleum hydrocarbon concentrations above the ECRA action level were detected during the Phase II investigation consistent with the soil samples collected during the previous sampling in the area of tanks TF-7, TF-8, and TF-8B (Area H). Shallow soil concentrations ranged from 26000 ppm to 200 ppm. Deeper samples at the 4 to 4.5 foot increment ranged from 1400 ppm to 93 ppm. A decrease in concentration with depth was noted in all but one sampled location.

5.1.8 - Area I - Cat Room

The Cat Room soil samples (Area I), collected during the Phase II investigation, contained cadmium and mercury in concentrations above the ECRA action level. Volatile organic compounds were detected in both soil samples consisting mainly of benzene and ethylbenzene. Boring 2I-2 also contained chlorobenzene, tetrachloroethene, and toluene.

5.1.9 Area J - Benzene Storage Tank

Soil samples collected in the Phase II investigation from the area adjacent to the benzene storage tank TF-9 (Area J) contained benzene concentrations ranging from 340 ppm to 2.2. ppm and petroleum hydrocarbon concentrations from 4100 ppm to 350 ppm.

5.1.10 Area K - West Tank Farm

Soil samples from the West Tank Farm (Area K) contained 0.059 ppm of ethylbenzene, 0.18 ppm of tetrachloroethene, and 0.57 ppm of toluene. No metals were detected above the ECRA action level.

5.2 GROUND WATER

Sampling during the Phase I investigation indicated that all the monitor wells at the site contained detectable levels of volatile organic compounds. The total concentrations of priority pollutant volatile organics detected in the wells ranged from 8 to 1346 ppb. Phase II sampling results indicated, with the exception of monitor wells MW-6S, MW-6D, MW-7D, and MW-12S, all monitor wells at the site contained detectable levels of volatile organic compounds exceeding the ECRA action levels.

Monitor well MW-2D sampled during the Phase I investigation contained 2.0 ppm of petroleum hydrocarbons which exceeded the 1.0 ppm ECRA action level for petroleum hydrocarbons in water. All other wells contained nondetectable levels of petroleum hydrocarbons. Petroleum hydrocarbons at concentrations ranging from 2.3 ppm to 1.3 ppm was detected in monitor wells MW-2D, MW-3D, MW-4S, and MW-8S from the Phase II sampling.

During Phase I sampling, mercury was detected in ground water samples from MW-1D, MW-3D, and MW-4D in concentrations ranging from 0.0004 ppm to 0.0006 ppm. In addition, MW-2S contained 0.047 ppm of cadmium. Mercury was detected in monitor wells MW-1S, MW-4D, and MW-9S at the detection limit of 0.0002 ppm from the Phase II sampling. In addition, barium was detected at 1.4 ppm in MW-4S.

Five of the monitor wells sampled during the Phase I investigation contained priority pollutant base neutrals or acid extractable organic compounds. MW-1S, MW-2S, and MW-4D contained base neutral compounds with total concentrations ranging from 11.0 to 79 ppb. Acid extractable compounds were detected in MW-2S, MW-2D, MW-3D, and MW-4D. The total concentrations of these materials in the monitor wells ranged from 13 to 90 ppb.

6.0 CLEANUP ACTIVITIES BY AREA OF CONCERN

This Cleanup Plan for the Hüls Elizabeth facility addresses those areas of concern identified during the two phases of sampling and analysis conducted at the facility. The development of this Cleanup Plan has considered the materials to be addressed, the nature of site soils and ground water, and limitations imposed by physical structures and continuing plant operations. The proposed cleanup activities are summarized below, and detailed in the following sections.

Soil excavation and disposal will be completed in accessible areas followed by the capping of those areas. In areas where soils are currently inaccessible, soils will remain on site but will be isolated to prevent the material from functioning as a source for metals and organic compounds redistribution into other areas of the site.

In addition to soil excavation, capping and isolation, a ground water recovery system will be installed at the site. The principal goal of the ground water recovery is to effect the greatest possible removal of ground water in the shallow saturated soils and deep sand layer.

A second objective of the ground water recovery system is to control ground water migration within and from the site. Recovery and control of ground water movement will be slightly more efficient within the deeper sand layer than in the silt and clay in the shallow system.

A formal Work Plan will be developed based upon the final methodologies which will be utilized in each area. The work plan will contain detailed specifications, schedules and a health and safety plan which will will be used in executing the cleanup plan at the Elizabeth site. Internal reviews are ongoing to finalize design details of this cleanup plan, such as selection of capping material and determination of whether recovered ground water will be treated onsite or offsite.

In order to evaluate the effectiveness of the proposed cleanup activities, a Public Health Risk Assessment (Attachment 1) has been prepared. The results indicate that after cleanup activities are completed, all potential exposure pathways will be eliminated. Therefore, the site will not present any significant public health impacts.

6.1 AREA A - RAIL SIDING

The rail siding along the southern border of the facility has been identified as having soils containing elevated concentrations of cadmium, lead, mercury, zinc and petroleum hydrocarbons. Remediation of this area will be accomplished through the excavation and disposal of soil. Initial work efforts will involve the removal of the existing rail ties and ballast of the spur. Steel I-beams will be installed along the northern side for approximately 40 feet of the spur to provide pinning for cross bracing that will be necessary for the shoring of the retaining wall on the southern side of the spur. Bracing will be necessary in the area of deeper soil excavation along easterly end of the rail spur (Figure 3.0).

Soil along the first 40 feet of the eastern end of the rail spur will be excavated to a depth of 4.0 to 4.5 feet across the width of the rail spur. It is anticipated that the excavation will uncover an abandoned drain line. Where practical, this pipe will be removed. At a minimum, the line will be flushed and sealed with concrete. This excavation will be completed in conjunction with the construction of a ground water recovery trench, which is described in Section 6.7.1. The remainder of the rail spur will have the upper 1.0 to 1.5 feet scraped off and disposed of appropriately.

Soil from the deeper excavation section beneath the eastern end of the rail spur will be saturated. To facilitate the handling and disposal of the soil, a staging area will be prepared to allow the soils to dewater prior to disposal. The staging area will be lined and will provide for the collection of the water drained from the soil.

Water encountered during the soil removal and soil dewatering will be pumped into a tank for holding prior to disposal, or directly to a tank truck for characterization and proper disposal.

Upon completion of the excavation activities, postexcavation sampling will be conducted to define concentrations remaining in the soil. The area will be filled, graded, a storm water collection system installed, and the area capped with asphalt or concrete. The railsiding may be reinstalled as the need for future operation is presently under review.

6.1.1 Area A1 - Section South of the Rail Siding

This area is a narrow triangular shaped section of soil which is located between the retaining wall and the property line which abuts the Conrail lines to the southwest. The area contains three active above ground storage tanks and footings from tanks removed in the past operation of plant. Sampling results in this area indicated the presence of barium, cadmium, lead, mercury, zinc and total petroleum hydrocarbons above the ECRA action levels in the upper 4.0 to 4.5 feet.

Remediation in this area will consist of capping the surface with concrete or macadam. Minimal excavation is proposed to maintain the structural integrity of the tanks and retaining wall, and provide for cap installation. The area will be graded to accommodate the cap and the cap will be placed over the existing soil. The cap will be keyed into the retaining wall and the existing tank footings to provide a continuous cover over this area. The top of the cap will meet the top of the retaining wall to direct precipitation runoff to the area of the former railsiding where storm water will be collected and conveyed through the storm water system. The footings that remain from tanks previously removed will also be removed.

6.2 AREA B - VINYL DEPARTMENT CRAWL SPACE

The Vinyl Department Crawl Space (Figure 2) underlies an area 61 feet by 55 feet below the Vinyl Department with approximately 12 to 18 inches of clearance between the floor of the Vinyl Department and the soil surface. The area is also intersected by a series of regularly-spaced pier footings which support the floor and building. Soil sampling results indicate that cadmium, mercury, zinc, petroleum hydrocarbons and PCB concentrations exceed ECRA action levels. Surface water that drains from this area is also a source for some of the materials found within the rail spur area.

As discussed previously with the NJDEP, the access limitations of the crawl space and the need to maintain the structural integrity of the buildings will necessitate that the soils in this Area B remain in place. The remediation in this area will involve the complete sealing of the crawl space to eliminate runoff and contain the material within the crawl space area. The sealing of the crawl space will be accomplished by constructing a concrete wall along the eastern and southern ends of the crawl space (Figure 2). This wall will be keyed into the existing outside wall of the crawl space and to the top of the building footings. This will effectively seal off the crawl space, thus preventing drainage of surface water from the crawl space and eliminating it as a source area for metals and compounds in Area A.

6.3 AREAS G AND J - EAST STORAGE TANK AREA

This area of the facility is located in a small court yard on the eastern side of the plant (Figure 2). It contains three underground tanks (TF-4, TF-6 and TF-20) which previously stored fuel oil for the plant boilers (Area G) and an abandoned underground benzene tank, "old" TF-9 (Area J). The area where the tanks are located is bounded to the north by the boiler room, to the east by the property line, to the south a tank farm containing 15 above ground vertical storage tanks and to the west by three aboveground storage tanks. The three underground fuel oil tanks are the focus of concern in this area and to a lesser extent the abandoned benzene tank. Soil sampling completed in this area indicated that the soils contain concentrations of petroleum hydrocarbons, base neutral compounds, and volatile organic compounds above ECRA action levels. Mercury was also detected consistently above the ECRA action level in borings in this area.

The close proximity of the building, tanks, and tank supports to Area G and J will preclude the removal of any of the existing underground tanks from this area without seriously compromising the structural integrity of the existing structures. In addition to the aboveground structures, any excavation this area would compromise the integrity of the active underground tank ("new" TF-9) located at the southern end of fuel oil tanks TF-4 and TF-6. The remediation in this area will be accomplished by abandoning all three fuel oil tanks in place, sealing the surface pavement, and integrating the area into the storm water collection system. Remedial efforts will be concentrated within the ground water remediation of this area discussed in Section 6.7. Abandoning the three underground fuel oil tanks will necessitate the installation of two new underground storage tanks to meet the operational requirements at the facility. The location of the new tank installation has yet to be determined.

6.4 AREA H - ABOVE GROUND STORAGE TANKS TF-7 and TF-8

The soils below these two above ground storage tanks contain petroleum hydrocarbon concentrations in excess of the ECRA action level. (Tank TF-8 is a divided tank containing compartments TF-8A and TF-8B.) The soils below the tanks will be excavated and disposed of in an approved manner. The minimum excavation will be 0.5 to 1 foot in depth.

The final excavation depth will be determined pending results of additional sample analysis. Two additional soil borings will be drilled in Area H and soil samples will be collected from the 12" to 18" intervals. The samples will be analyzed for volatile organics, base neutrals, and petroleum hydrocarbons. The sample results will be reviewed for health risk concerns to determine if additional excavation is necessary. The proximity of the boiler house wall footings to this area will necessitate that the excavation be sloped away from the building to avoid undermining the footings.

Upon completion of excavation activities, postexcavation samples will be collected to determine if any concentrations remain in the soil. The area will be backfilled, graded, and capped with asphalt or concrete.

6.5 AREA F - ABOVEGROUND TANKS TF-5 AND TF-6

Soil samples were collected during the Phase I investigation from two small areas of soil not covered with concrete in this area (Figure 2). The analytical results indicated petroleum hydrocarbons, lead, mercury and volatile organic concentrations above ECRA action levels.

Remediation will involve the removal of soil and the capping of the area with concrete or macadam. In area F-1 (Figure 3), all the soil contained within the concrete trough formed by the tank footings will be removed and the area will be filled with concrete or macadam to grade. In area F-2 (Figure 3), soil will be removed to a depth of 1 to 2 feet to provide for cap installation. The grade will be restored with fill, and the area will be capped.

6.6 AREA D - WAREHOUSE II YARD

Soil samples were collected along areas where the concrete pavement in this area formerly abutted soil areas. As part of plant operations, the concrete skirt in this area was extended in December 1988, and concrete diking was placed around the perimeter of the yard. Only one isolated area behind the diking still remains uncovered (Figure 3). This area will be capped with concrete or macadam to complete the covering of this area.

Soil sampling results in this area detected isolated areas of petroleum hydrocarbons, cadmium, lead, mercury, and volatile organic compounds above ECRA action levels. As a result of the December 1988 placement of the concrete over the areas of concern, no other remediation is proposed for the soils in Area D.

6.7 GROUND WATER

In order to address the compounds detected in both the sahllow saturated soils and the deep sand layer, a ground water recovery system will be installed at the Elizabeth site. Where applicable, installation of the ground water recovery system will be integrated with the soil remediation activities described previously. The installation of any other components of the ground water recovery system and treatment system will be initiated upon the completion of soil remediation activities. Recovery of the shallow ground water will be started two weeks prior to the recovery of any deeper ground water. The recovery system will utilize both trenches and wells to collect ground water. Depending upon cost effectiveness, the recovered ground water will be handled either by pretreatment prior to discharge to the POTW (publicly owned treatment works, the Joint Meeting Sewage Authority), or by transport to an appropriate offsite treatment facility.

Prediction of the efficiency of a ground water recovery system and the time frames involved in the recovery are difficult in low permeability soils and discontinuous hydraulic systems such as those found at this site. Based on these hydrogeologic characteristics, the goal of the recovery effot is to limit migration of materials (wherever possible) in either ground water zone. The recovery system has been designed to address specific areas of concern and allows for evaluation and modification over time based upon performance monitoring.

6.7.1 Ground Water Recovery

The following discussion of the ground water recovery system (Figure 4) has been broken down by the individual areas of concern which it addresses.

Area A - Rail Siding

Analytical results from the Phase I and Phase II investigations indicated that concentrations of volatile organic compounds, mercury, cadmium, base neutral and acid extractable compounds exceed ECRA action levels in Area A. The recovery system in this area will consist of a trench and two recovery wells (Figure 4). The trench will consist of two laterals constructed of four-inch agricultural drain pipe running parallel to the rail spur which will be connected to a central precast concrete sump. The laterals will be covered with a filter sock and placed directly on the soil at the bottom of the trench. Pea gravel will be backfilled around the pipe to a depth of 2 to 3 feet above the pipe. The remainder of the excavation will be backfilled and capped in accordance with the soil remediation previously described for this area in Section 6.1. The sump will contain a pump capable of sustaining a pumping rate of 1 to 3 gallons per minute (gpm) and level controls to prevent the pump from pumping the sump dry.

The trench will serve two functions: to effect the recovery of ground water within this area, and to act as a barrier to the migration of ground water from the potential recharge area to the south of the site.

Two wells will be installed in Area A to collect ground water from the shallow saturated soil and from the deeper sand layer. The wells will be constructed of six-inch diameter PVC, with appropriate lengths of 0.010 slotted screen. Each well will have an individual pump and level controls. The six-inch diameter of the recovery wells (versus four-inch) was selected to facilitate the installation and maintenance of the pump and to take advantage of any increased storage capacity within the well bore afforded by the larger diameter well for more continuous operation of the pumps. Table 5 summarizes the recovery well installation depths.

Areas G and J - East Underground Storage Tank Area

Sampling results have detected petroleum hydrocarbons, base neutral compounds, and volatile organic compounds in the ground water at concentrations above ECRA action levels in Area G and J.

Ground water recovery in these areas will be integrated into the tank abandonments to be conducted in Area G. Tanks TF-4 and TF-20, and monitor well MW-8S will be used to recover ground water (Figure 4).

The three underground fuel oil storage tanks, TF-4, TF-6, and TF-20 will be cleaned in place. The tanks will be uncovered, and all venting, heating, and supply lines disconnected and removed. The tank inlets will be plugged, any remaining tank contents will be removed and the tank interiors cleaned. Tank TF-6 will be abandoned in place according to the requirements of the local fire code.

Tanks TF-4 and TF-20 will be abandoned in place and converted to act as recovery sumps. A six-inch diameter section of well screen and riser will be placed vertically into the manway of each tank. The screen will extend to the bottom of the tank, and the solid riser will bring the recovery well to grade. The tanks will then be filled with well graded sand. A one foot bentonite seal will be placed between the sand and the riser within the manway to facilitate the cementing of the riser through the manway of the tank. Each tank will then be pierced by driving a thin hardened rod through the tank ends and along the axis of tanks. Each recovery well will be equipped with a 1 to 2 gpm pump which will pump recovered ground water to the onsite treatment system or collection point for offsite treatment/disposal.

A small diameter air driven pump will also be installed in MW-8S to facilitate the recovery of ground water around it.

Areas G and J - East Driveway

Two six-inch diameter recovery wells will be installed near MW-4S and MW-4D to collect shallow and deep ground water along the east driveway as depicted in Figure 4. Sampling has detected volatile organic compounds in the ground water within this area. The wells will be screened as outlined in Table 5. A 1 to 2 gpm pump will be installed in each well. Collected water will be sent to the onsite treatment facility to be constructed as described in Section 6.7.2, or to a collection point for offsite disposal.

Area I - Cat Room

Sampling results for the soils behind the walls of the cat room indicate the presence of cadmium, mercury, lead, and volatile organic compounds. While this area is totally inaccessible from a soil remediation perspective, recovery of water from the saturated soils within this area will be initiated to assist in controlling ground water within the site.

A series of eight, two-inch diameter well points will be driven into the soils behind the walls of the cat room. Three each will be installed along the east and west walls, and two into the south wall (Figure 4). The points will be two-inch diameter, 0.010 slot, steel drivepoints installed horizontally into the soil behind the walls. The free end of each well point will be connected to a common header pipe. Water will move into the well points by both gravity and suction applied through a regenerative blower attached to the system. Water collected by the system will be routed to the onsite treatment facility, or collection for offiste disposal Air from the regenerative blower will meet the requirements of New Jersey's Air Emission Discharge regulations.

Seeps currently exist in parts of the walls of the cat room. These seeps will be addressed through an overall program of cleaning and sealing of the walls within the cat room with will occur as part of the remediation in this area.

Recovery Well Installation

The following is a summary of the specifications for the ground water recovery wells to be installed at the Hüls-Elizabeth facility. As described in the previous sections, four recovery wells, three shallow and two deep, will be installed to collect ground water from the shallow saturated soils and deeper sand layer. The recovery well locations are depicted in Figure 4.

All recovery wells will be installed in accordance with NJDEP Unconsolidated Monitor Well Specifications. Drilling will be executed using either hollow stem auger or water wash/mud rotary. Hollow stem auger installation is the preferred method of well installation, but may not be possible based upon actual lithologic character of the overburden at the site. For stratigraphic control, continuous sampling will be performed on all recovery wells using two-inch O.D. split spoons. Continuous sampling in the deeper wells will be conducted to delineate the location and thickness of the deeper sand layer.

Each recovery well will be constructed of six inch diameter, 0.020 inch slot, schedule 40 PVC well screen and Schedule 40 PVC riser. Screen lengths will vary with the well location. Table 5 summarizes recovery well specifications. Completion of each well will involve the sand packing of the annular space of the well screen to approximately one foot above the screen. This will be followed by a two-foot bentonite pellet seal, which will be followed a casing seal of cement and bentonite.

TABLE 5

RECOVERY WELL CONSTRUCTION DETAILS

HULS AMERICA INC.
ELIZABETH, NEW JERSEY

Recovery Well Designation	Well Diameter (inches)	Total Well Depth (feet)	Screen Length (feet)	Screen Slot Size (inches)
RW-1-15	6	15	10	0.010
RW-1-45	6	45	15	0.010
RW-2-15	6	15	10	0.010
RW-2-37	6	37	15	0.010

All recovery wells will be completed with flush mounted water tight protective steel curb boxes or manhole covers and frames. Waterproof well caps, which will allow for the exiting of piping and power connections for recovery pumps, will be installed on the wells. All wells will be installed by a New Jersey licensed well driller and installation activities will be supervised by a qualified geologist. Soils will be classified using the Unified Soil Classification System (USCS).

6.7.2 Ground Water Treatment System

The ground water treatment system designed for the Hüls Elizabeth facility will allow for the pretreatment of recovery ground water from the recovery systems prior to discharge to the POTW. The treatment system outlined in the following section is designed for the treatment of all recovered ground water.

Additional systems are being evaluated for use on specific recovered ground water streams. In particular, a system for recovering benzene in Area G (the underground storage tank area) is under consideration. Also under consideration is the possibility of transporting all collected ground water to an offsite facility for treatment/disposal, depending upon cost effectiveness.

Main Treatment System

The treatment system will be designed for an operating range of between 5 and 10 gpm. The system is depicted in Figure 5. All ground water collected on the southern site of Magnolia Ave. will be sent to the treatment system.

Water will be pumped into an oil water separator to remove any free phase petroleum hydrocarbons. Petroleum hydrocarbons collected from the oil water separator will be collected in a 250 gallon tank temporary storage tank prior to offsite disposal.

Water from the oil-water separator will then pass through a filter to remove any suspended sediment remaining in the water. After filtration, the water will be pumped into a counter current air stripper and then discharged to the POTW. The air stream from the air stripper may be treated using a vapor phase carbon system. The carbon system will be designed to minimize monitoring of the treatment system and the number of carbon changes needed.

6.7.3 Operational Plan

An operational plan will be prepared that will include the detailed operation of the ground water recovery system and treatment systems. The plan will contain all schedules for sampling, data analysis, reporting formats and frequencies, and detailed operational information on the components of the ground water cleanup program will be designated. Options in case of failure of any part of the system will be detailed in the operational plan as well as preventative maintenance procedures and schedules.

6.7.4 Monitoring Plan

The monitoring plan will enable the effectiveness of the ground water cleanup program to be evaluated by providing a record of the changes in ground water quality over time. It will also document the operation of the ground water cleanup systems. This record will include the operational parameters described in this section used to evaluate the performance of the recovery and treatment systems.

Water Levels

Water level measurements will be used to verify that the ground water gradients within the site are adequate to control ground water movement from specific areas. Water levels will be measured frequently in the early stages of operation and less frequently thereafter as an adequate data base is developed.

During the first month of operation, water levels in all monitoring and recovery wells will be measured daily. This will assure that the withdrawl rates from the trenches and recovery wells are producing the desired control at the site. It is likely that the pumping rates in some or all of the trenches and recovery wells will be adjusted slightly during the first month of operation. The goal is to achieve a sufficient control of the ground water at the site and at the same time not compromise the recovery equipment.

Water levels will be measured on a weekly basis for the next two months to determine the impacts of short term events, such as storms. These measurements will provide a fine tuning of the system and ensure that there is sufficient pumping capacity to accommodate any possible increases in ground water withdrawls due to short term events.

Water levels will be measured in all monitor and recovery wells biweekly after the first three months of operation to determine the impact of seasonal changes in the local ground water. Biweekly monitoring will be conducted to the first anniversary of the initiation of recovery operations. Remaining water level monitoring will be conducted monthly or quarterly dependent upon the results of the first years monitoring.

Treatment System Performance

The effectiveness of the ground water treatment system will be determined by periodic sampling of the influent and effluent of the treatment system. In order to gauge effectiveness, performance predictions will be made prior to the startup of the treatment systems.

Where free product, sludges or other solid wastes are generated, the monitoring program will keep records of the disposal of this material.

System Performance

Quarterly reports will be generated that evaluate overall system performance for the first year of the system operation. Reports will be prepared on an annual basis after the first year. The reports will include water table contour maps for each set of water level readings. Performance records for the recovery systems will be included, as well as sampling results from the treatment system. An analysis of the data will be provided along with an assessment of the performance of the recovery system. Problems with the operation of the system will be noted as will any changes in the operation that resulted from the problems.

Monitoring Cleanup Effectiveness

The effectiveness of the cleanup program will be measured through the collection of samples from the monitor wells, and noting changes over time. The sampling will consist of the collection of samples at regular intervals and analysis of a standard list of parameters.

The monitoring program will entail the collection and analyses of samples for key indicator parameters (total petroleum hydrocarbons and benzene on a quarterly basis). Analyses for all volatile organics and base neutral compounds will be collected on an annual basis.

All sampling procedures will follow NJDEP guidelines, and analyses will be conducted in a New Jersey certified laboratory. Proper chain of custody and QA/QC procedures will be followed for all ground water sampling.

The quarterly sample results will be plotted on time versus concentration graphs to track the effectiveness of the cleanup program. The annual sampling will be tabulated in a similar standard format.

In addition to the monitor well measurements, the quarterly sampling will include samples from the influent and effluent of the ground water treatment system. The quality of the water from the recovery system, coupled with the flow rate, will provide a measurement of the material removed from the subsurface.

6.7.5 Reporting

Periodic progress reports will be provided by Hüls for the NJDEP as an operational record for the ground water cleanup program.

Quarterly Reporting

During site remedial activities, the progress of the soil remediation and ground water recovery and treatment system installation will be documented in quarterly reports. The reports will detail the progress and difficulties encountered during the execution of the Work Plan.

A final summary report on the site remediation will be prepared upon completion of the ground water recovery and treatment system installation. The report will summarize the activities at the site and provide an evaluation of the soil remedial activities.

The quarterly treatment system reports will contain sections for operational monitoring and an evaluation of cleanup effectiveness.

The quarterly and semi-annual reporting will consist of graphical presentations of the operational parameters such as flow rates from the recovery trenches and wells, mass loading to the treatment system, and ground water treatment system evaluation. There will be a discussion of the general operation of the system including a discussion of any operational problems. Recommendations to modify either the equipment or procedures to make the system more efficient will also be presented.

The report will include ground water contour maps for all sets of water level measurements made during the quarter. The overall effectiveness of the ground water recovery system or collecting water and removing constituents will be assessed. This will include conclusions about system effectiveness and recommendations for changes in the process, if necessary.

Annual Report

The annual report will contain results from the analysis of the expanded set of water quality analyses, and an assessment of the operation of the system over the year.

7.0 REMEDIAL LEVELS

The extent to which any area at the Elizabeth facility will be remediated was developed by consideration of the specific contaminant, cleanup methods to be utilized and the physical constraints imposed by both the natural conditions and plant operations. The estimated concentrations remaining at the site after the proposed actions are completed have been evaluated in a Public Health Risk Assessment (Attachment 1).

The remediation of the soils at the site will center around three methods. The first will involve the capping and isolation of soil areas which are inaccessible. The second involves the excavation of soils in accessible areas and subsequent proper disposal of the soil. The third is implementation of ground water control to limit the possible migration of materials left in the soils.

7.1 SOILS

The levels outlined for various metals and compounds in the following section are based on sampling data in those areas. In these areas where no excavation or removal is planned, the levels presented illustrate the highest known levels which will remain in the soil within capped and isolated areas of the site.

AREA	ESTIMATED CONCENTRATIONS BENEATH CAPPED AREAS
Area A1 - Tank Siding	
Petroleum Hydrocarbons	8,500 ppm
Mercury	20 ppm
Zinc	450 ppm
Area B - Vinyl Department Crawl Space	
Cadmium	3,800 ppm
Mercury	20,00 ppm
Zinc	1,100 ppm
Petroleum Hydrocarbons	17,000 ppm
Total Volatile Organics	55 ppm
Base Neutrals	1,150 ppm
PCBs	550 ppm

Area J and G - Tanks TF-4, TF-5, and TF-20

Petroleum Hydrocarbons	4,800 ppm
Total Volatile Organics	3,000 ppm
Mercury	3,000 ppm
Total Base Neutral Compound	50 ppm

Area D - Warehouse II Yard

In areas where excavation will be conducted, the levels illustrated represent the concentration of metals and compounds will remain below capped areas subsequent to the remediation.

AREA	ESTIMATED CONCENTRATIONS BENEATH CAPPED AREAS
Area A - Rail Siding	
Cadmium and Mercury (each)	60 ppm
Area H - Tanks TF-7, TF-8A and TF-8B	
Petroleum Hydrocarbons	1,500 ppm
Area F - Tanks TF- and TF-	
Mercury	10 ppm
Petroleum Hydrocarbons	120 ppm
Lead	750 ppm
Total Volatile Organics	10 ppm

All these levels are the basis for the Risk Assessment prepared for the Elizabeth facility (Attachment 1). Postexcavation samples will be compared to these anticipated levels and to the risk evaluation. If remaining concentrations are significantly different than those anticipated by preremediation sampling, those concentrations will be reevaluated within the risk assessment framework.

7.2 GROUND WATER

Ground water remediation levels will be based on operative levels which will be achievable based on the ground water hydraulics of the site. The low hydraulic conductivities and specific yields will severely limit the extent to which any ground water can be recovered and hence compounds removed. Therefore, the effectiveness of the ground water clean up will be based upon the continuing evaluation of the recovery system, treatment system, and compound concentrations in monitor wells around the site overtime. Major changes in concentrations or the suite of compounds within the monitor wells or recovery system are milestones which will be evaluated as they occur.

The milestones will indicate the influence of the system into other areas of the facility, removal of material from within the facility or the influence of the system into other offsite areas. As the milestones occur they will be evaluated within the context of the current remedial trends within the ground water system based upon prior monitoring.

It should be noted that if in the course of ground water remediation it is evident that material is being recovered from off-site sources, the NJDEP will be notified. The operation of the recovery system will be adjusted to eliminate or minimize the recovery of materials originating from off-site.

GROUNDWATER MONITORING
QUARTERLY REPORT NO. 1

HÜLS AMERICA INC.
ELIZABETH, NEW JERSEY
ECRA CASE NO. 85374

PREPARED FOR:

HÜLS AMERICA INC.
830 MAGNOLIA AVENUE
ELIZABETH, NEW JERSEY 07201

SUBMITTED BY:

IT CORPORATION
165 FIELDCREST AVENUE
EDISON, NEW JERSEY 08837

PROJECT NO. 529051

DECEMBER, 1990

LH955-rpt

INTERNATIONAL TECHNOLOGY CORPORATION

December 21, 1990

Mr. Sal Balakrishnan
New Jersey Department of Environmental Protection
Division of Hazardous Waste Management
BEECRA Cleanup Oversight Section
401 East State Street
CN-028
Trenton, New Jersey 08625-0028

RE: Groundwater Quarterly Monitoring Report No. 1
Hüls America Inc.
Elizabeth Facility
ECRA Case No. 85374

Dear Mr. Balakrishnan:

Enclosed are three copies of the above-referenced report. This report has been prepared in fulfillment of the groundwater monitoring program included in the Letter of Conditional Cleanup Plan Approval dated May 31, 1990 for the site. Attachments 1 and 2 are the analytical QA/QC Package for this quarterly report, and are forthcoming shortly under separate cover.

Quarterly groundwater monitoring will continue as per the cleanup plan schedule submitted by Hüls America Inc. with the monthly status report dated December 7, 1990.

Please contact me if you have any questions.

Very truly yours,

IT CORPORATION

B Maginn

Barbara Maginn, P.E.
Project Manager
Environmental and Civil Engineering

BM/lh
Enclosures
#528703

cc: J. Wnek
A. Kruzcek
D. Li

Regional Office
165 Fieldcrest Avenue • P.O. Box 7809 • Edison, New Jersey 08818-7809 • 201-225-2000

LH955-rpt

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(FORTHCOMING UNDER SEPARATE COVER)

1.0 INTRODUCTION

This quarterly groundwater sampling and analysis report has been prepared for the Hüls America Inc. facility in Elizabeth, New Jersey (ECRA Case No. 85374). The report is being submitted in accordance with the groundwater monitoring requirements in Items 5 and 6 of the New Jersey Department of Environmental Protection's (NJDEP's) letter of Conditional Cleanup Plan Approval dated May 31, 1990. This submittal is the first quarterly report (No. 1) and covers the months of July, August, and September 1990.

Quarterly sampling and analysis will continue for three more quarters as per the Cleanup Plan Approval Letter. The second quarterly sampling event occurred during the week of October 22, 1990. The next quarterly report (No. 2) will cover the months of October, November, and December 1990, and will be submitted in mid-January 1991.

2.0 GROUNDWATER SAMPLE COLLECTION

Monitor wells were sampled for this first quarterly report on September 20th and 21st, 1990. For the first round, the Cleanup Plan Approval Letter required the collection of samples from the following 18 monitor wells: MW-1S, MW-1D, MW-2S, MW-2D, MW-3S, MW-3D, MW-4S, MW-4D, MW-6S, MW-6D, MW-7S, MW-7D, MW-8S, MW-9S, MW-10S, MW-10D, MW-11S and MW-12S. The analytical parameters for the first round of groundwater sampling were based on the Cleanup Plan Approval Letter and are summarized in Table 1.

The monitor wells were sampled according to NJDEP sampling procedures. Each well was first measured for static water level and total depth in order to determine the volume of the water column. Prior to obtaining samples, each well was purged approximately three times the volume of the water column. Purging was accomplished using a peristaltic pump at a pumping rate of approximately one gallon per minute.

Groundwater samples were collected using either laboratory-cleaned dedicated stainless steel bailers or Teflon bailers. Samples were labeled at the field location and placed into transport coolers containing ice bags. A field blank of the sampling equipment was obtained onsite for both sampling dates (September 20th and September 21st, 1990). Travel blanks and chain-of-custody documentation accompanied the samples to the NJDEP-certified laboratory for analysis (IT Corporation, Analytical Services - Edison, New Jersey). One well, MW-11S, was dry on both sampling days and therefore could not be sampled.

3.0 RESULTS

3.1 WATER LEVEL MEASUREMENTS

Groundwater elevations were calculated from the water level measurements obtained on September 20th and 21st, 1990. Figure 1 is a groundwater contour map for the shallow wells constructed from the water level elevations shown on the figure. Figure 2 is a groundwater contour map for the deep wells constructed from the water level elevations shown on the figure. Groundwater flows from higher to lower elevations and perpendicular to the elevation contours.

The apparent flow direction of the shallow perched water is to the east-northeast on both the northern and southern sides of Magnolia Avenue. The northeast flow direction on the northern side of Magnolia Avenue is inconsistent with the southwest direction noted during the Phase II investigation (December 1988). Monitor well MW-5S, installed as a dry well in 1986 has remained dry. Monitor well MW-11S, installed during the Phase II investigation in 1988, has been dry since installation.

For the deep groundwater, the flow direction is to the east-northeast across the site, consistent with the results of the Phase II Investigation.

3.2 ANALYTICAL RESULTS

The analytical results for the first quarterly sampling event are summarized in Table 2. The Analytical Data Reports, which include the ECRA QA/QC Summary, are bound as separate attachments for each sampling date. The site-specific NJDEP groundwater cleanup criteria and general NJDEP action limits are presented in Table 3. The results for each analytical parameter are summarized in the following sub-sections.

3.2.1 Volatile Organics

MW-9S contained the highest concentration of benzene, 3500 ppb. MW-4S contained the highest concentration of chlorobenzene, 120 ppb. The well samples that have total volatile organic concentrations exceeding the NJDEP cleanup limit of 50 ppb are MW-1D (1630 ppb), MW-3D (206 ppb), MW-4S (595 ppb), MW-4D (359 ppb), MW-8S (98 ppb), MW-9S (3500 ppb), and MW-10S (100 ppb).

3.2.2 Base Neutral Compounds

Base neutral compounds were detected in the samples from MW-1D, MW-2S, MW-3D, MW-4S, MW-7S, MW-8S, MW-9S, MW-10S and MW-12S. Among these wells, four exceeded the 50 ppb limit for total base neutral compounds: MW-2S (104 ppb), MW-3S (65 ppb), MW-4S (89 ppb) and MW-8S (142 ppb).

3.2.3 Total Priority Pollutant Metals - Unfiltered Samples

NJDEP frequently requests metal analysis on groundwater using unfiltered samples. This data cannot be used in health risk-based evaluations since it usually reflects the inability of monitoring well screens and packings to ideally filter particulates. Applying health risk considerations, including NJDEP permit fee calculations should more accurately rely on filtered sample results (see Section 3.2.4).

For total priority pollutant (PP) metals concentrations that were either non-detectable or below ECRA limits were found in all wells for six of the thirteen PP metals as follows: antimony, copper, selenium, silver, thallium and zinc. Results for the remaining nine total PP metals are discussed below. Arsenic was detected in several well samples, but only MW-4D (0.056 ppm) contained levels above the NJDEP cleanup limit (0.05 ppm). Beryllium (which has no ECRA limit) was detected in only three out of the seventeen well samples, ranging in concentration from 0.005 ppm (MW-2D) to 0.018 ppm (MW-4D).

Cadmium was found in all wells except MW-1D. Cadmium levels exceeded the NJDEP cleanup limit (0.01 ppm) in 13 wells: MW-1S (0.017 ppm), MW-2D (0.099 ppm), MW-3S (0.019 ppm), MW-3D (0.018 ppm), MW-4S (0.25 ppm), MW-4D (0.071 ppm), MW-6S (0.016 ppm), MW-7S (0.072 ppm), MW-7D (0.011 ppm), MW-8S (3.6 ppm), MW-9S (0.025 ppm), MW-10S (0.021 ppm) and MW-12S (0.012 ppm).

Chromium was detected in all wells except MW-1S. Concentrations higher than the NJDEP action limit of 0.05 ppm were detected in six wells: MW-2D (0.094 ppm), MW-4S (0.062 ppm), MW-4S (0.078 ppm), MW-7S (0.13 ppm), MW-8S (0.93 ppm) and MW-10S (0.058 ppm).

Lead was found in all well samples, but at concentrations above the ECRA action limit of 0.05 ppm in only seven wells: MW-2D (0.14 ppm), MW-3D (0.083 ppm), MW-4S (0.46 ppm), MW-4D (0.041 ppm), MW-7S (0.071 ppm), MW-8S (3.1 ppm) and MW-10S (0.064 ppm). Mercury was detected in all well samples except MW-6D. Concentrations above the ECRA limit of 0.002 ppm were found in

11 samples as follows: MW-1S (1.3 ppm), MW-2S (0.003 ppm), MW-2D (0.003 ppm), MW-3S (0.0026 ppm), MW-4S (0.014 ppm), MW-4D (0.002 ppm), MW-6S (0.004 ppm), MW-7S (0.009 ppm), MW-7D (0.003 ppm), MW-8S (6.8 ppm), and MW-9S (0.003 ppm). Nickel (which has no ECRA limit) was detected in 10 out of the 17 well samples, ranging in concentration from 0.047 ppm (MW-12S) to 3.2 ppm (MW-8S).

3.2.4 Dissolved Priority Pollutant Metals - Filtered Samples

For dissolved PP metals, concentrations were non-detectable in all 17 well samples for six metals as follows: antimony, beryllium, copper, selenium, silver and thallium. All other results were at or below ECRA limits (where established) except for two of the cadmium results. The ECRA action limit for cadmium is 0.01 ppm; the sample from MW-2S contained 0.017 ppm and the sample from MW-8S contained 0.014 ppm.

3.2.5 PCBs

PCBs were detected only in the sample from MW-8S, in which Arochlor 1248 was detected at a concentration of 3400 ppb. During the sampling, it was noted that MW-8S contained dark oily product on the water surface. Though the well was purged approximately three times the volume of the water column, there was still residual dark oily product floating on the surface of the sample. MW-8S contained free product during the previous sampling event, and will be converted to a recovery well as part of the groundwater cleanup activities to be implemented at the site.

3.2.6 Total Dissolved Solids (TDS) and pH

TDS results ranged from a minimum 360 ppm in MW-2D to a maximum of 7300 ppm in MW-1D. The pH results ranged from a minimum of 6.1 in MW-8S to a maximum of 11.8 in MW-1D.

4.0 DISCUSSION AND CONCLUSIONS

For the purposes of discussion, the results of this first round of quarterly monitoring have been compared to the appropriate ECRA action limits, and the most recent sampling event (December 1988 for the Phase II Investigation), where applicable.

Based on this evaluation, the following conclusions can be drawn:

1. Although groundwater cleanup activities have not yet been initiated, total VOC and total base neutral concentrations decreased in a majority of the wells sampled (10 out of 17, and 11 out of 17, respectively).

2. For priority pollutant volatile organics analysis, benzene was detected at a significantly higher concentration than Phase II investigation results in four wells: MW-1D (1630 ppb vs. 310 ppb), MW-4D (350 ppb vs. 92 ppb), MW-9S (3500 ppb vs. 720 ppb) and MW-10S (89 ppb vs. 24 ppb). All other well samples showed either lower concentrations or non-detectable.

3. Results of priority pollutant metals analysis showed a slightly higher concentration compared with Phase II investigation results. But most of the PP Metal results are still at or below ECRA limits. Only mercury was detected at the level higher than ECRA limit (0.002 ppm) in 11 wells (ranging from 0.0026 ppm [MW-3S] to 1.3 ppm [MW-1S]).

4. One well, MW-6D, contained no concentrations above ECRA action limits for any parameter analyzed during the first quarterly monitoring. It is proposed that this well be eliminated from the third and fourth monitoring quarters if the second quarterly results are below ECRA guidelines.

5. According to the cleanup plan approval letter dated May 31, 1990, if wells MW-7D and MW-12S exhibit levels at or below the detection limit, then they can be eliminated from regular sampling. Although MW-7D had detectable levels of priority pollutant metals and MW-12S showed detectable levels of priority pollutant metals and base neutrals during this first quarterly monitoring event, the ECRA guideline excursions were very limited. For cadmium (ECRA limit 0.01 ppm), the sample from MW-7D contained 0.011 ppm, and the sample from MW-12S contained 0.012 ppm. For mercury (ECRA limit 0.002 ppm), the sample from MW-7D contained 0.003 ppm.

6. Monitor well MW-8S exhibited the highest concentrations of target compounds compared with other wells. PCBs, volatile organics, base neutrals and priority pollutant metals were all detected in MW-8S above ECRA limits. This is due to the presence of free product, which will be addressed during cleanup plan implementation in 1991.

TABLES

TABLE 1
SUMMARY OF FIRST QUARTERLY SAMPLING ANALYSES
HÜLS AMERICA INC. - ELIZABETH, NEW JERSEY

Monitor Well	Date Sampled	Analytical Parameters
MW-1S	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-1D	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-2S	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-2D	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-3S	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-3D	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-4S	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-4D	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-6S	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-6D	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-7S	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-7D	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-8S	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-9S	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-10S	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-10D	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
MW-12S	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
Field Blank	09-20-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals
Field Blank	09-21-90	VO+15, BN+15, PCBs, pH, TDS and Total and Dissolved PP Metals

NOTE:

MW-11S was dry on 9/20/90 and 9/21/90 and therefore could not be sampled.

VO+15 - Volatile Organic Compounds plus forward library search.

BN+15 - Base Neutral Compounds plus forward library search.

PCBs - Polychlorinated biphenols

TDS - Total Dissolved Solids

PP - Priority Pollutant

TABLE 2
SUMMARY OF QUARTERLY GROUNDWATER ANALYTICAL RESULTS
HULS AMERICA INC. - ELIZABETH, NEW JERSEY

Sample I.D.	MW-1S	MW-1D	MW-2S	MW-2D
Sample Date	9/20/90	9/20/90	9/20/90	9/21/90
Analytical Parameters:				
pH (Std. units)	6.8	11.8	6.8	7.…
Total Dissolved Solids (ppm)	1300	7300	540	36…
PP Metals-total (ppm)				
Antimony	ND	ND	ND	N…
Arsenic	0.018	ND	ND	0.01…
Beryllium	ND	ND	ND	0.00…
Cadmium	0.017	ND	0.009	0.09…
Chromium	ND	0.014	0.018	0.09…
Copper	0.24	0.034	0.11	0.1…
Lead	0.048	0.009	0.010	0.1…
Mercury	1.3	0.0009	0.003	0.00…
Nickel	ND	ND	ND	0.11
Selenium	ND	ND	ND	N…
Silver	ND	ND	ND	0.01…
Thallium	ND	ND	ND	N…
Zinc	0.15	ND	0.003	0.31
PP Metals-dissolved (ppm)				
Antimony	ND	ND	ND	ND
Arsenic	ND	ND	ND	ND
Beryllium	ND	ND	ND	ND
Cadmium	ND	ND	ND	0.017
Chromium	ND	ND	ND	ND
Copper	ND	ND	ND	ND
Lead	ND	ND	ND	0.031
Mercury	0.002	ND	ND	ND
Nickel	ND	ND	ND	ND
Selenium	ND	ND	ND	ND
Silver	ND	ND	ND	ND
Thallium	ND	ND	ND	ND
Zinc	ND	ND	ND	0.037
PCB's (ppb)				
Arochlor 1248	ND	ND	ND	ND
Base Neutrals (ppb)				
Bis(2-Ethylhexyl)phthalate	ND	13	21	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
Naphthalene	ND	ND	83	ND
Total base neutrals	ND	13	104	ND
Total NBS search for BN (ppb)	679	16	1791	68600
Volatile Organics (ppb)				
Benzene	ND	1630	ND	ND
Chlorobenzene	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
Total volatile organics	ND	1630	ND	ND
Total NBS search for VOC (ppb)	120	215	50	50

Notes:
(1) ND - Analyzed but not detected
(2) NA - Not analyzed
(3) FB - Field blank
(4) TB - Trip blank

TABLE 3

NJDEP GROUNDWATER CLEANUP PLAN CRITERIA AND TARGET LIMITS
HÜLS AMERICA INC.
ELIZABETH, NEW JERSEY SITE
CASE NO. 85374

Based on NJDEP Cleanup Plan Approval Letter dated May 31, 1990, the groundwater cleanup criteria for the site are as following:

Compound	Cleanup Criteria (ppb)
1,2-Dichlorobenzene	*
Benzene	1.0
Chlorobenzene	4.0
Ethylbenzene	*
Toluene	*
Naphthalene	*

Note: * - combined total shall not exceed 50 ppb.

In addition, NJDEP has issued a series of target groundwater action limits to be used on a case by case basis as follows:

Compound	Action Limit (ppb)
Metals:	
Antimony	-
Arsenic	50
Barium	1,000
Beryllium	-
Cadmium	10
Chromium	50
Copper	1,000
Lead	50
Mercury	2
Molybdenum	-
Nickel	-
Selenium	10
Silver	50
Thallium	-
Vanadium	-
Zinc	5,000
Organics:	
Total Base Neutral Extractables	50
Total Acid Extractables	50
Total Petroleum Hydrocarbons	1,000
Total PCBs	1

7

State of New Jersey
Department of Environmental Protection
Division of Water Quality
401 East State Street, CN-029
Trenton, New Jersey 08625

FACT SHEET
FOR A DRAFT NJPDES PERMIT TO DISCHARGE INTO THE SURFACE WATERS OF NEW JERSEY

Permit No. NJ0102270	Date:
Name & Address of Applicant:	Huls America, Inc. Turner Place Piscataway, New Jersey 08855
Name & Address of Facility where Discharge Occurs:	Huls America, Inc. 830 Magnolia Avenue Elizabeth, New Jersey 07210 (Elizabeth City, Union County)
Receiving Water & Method of Conveyance:	Perimeter Ditch That Circumscribes Newark Airport
Receiving Water Classification:	FW2-NT

I. DESCRIPTION OF FACILITY

The above named applicant has applied for a New Jersey Pollutant Discharge Elimination System (NJPDES) permit to the State of New Jersey, Department of Environmental Protection(the Department), Division of Water Quality to discharge effluent into the designated receiving water. A location map of the facility is included in this fact sheet.

Huls America, Inc. is responsible for cleaning up the groundwater in accordance with the New Jersey Environmental Cleanup and Responsibility Act (ECRA) regulations since its past manufacturing operations caused the groundwater contamination. During manufacturing operations, Huls collected the contaminated groundwater from four recovery wells, three recovery trenches/sumps and eight well points and used this water in the manufacturing operations. This used water was then discharged to the Joint Meeting of Union and Essex Counties (JMUEC). This discharge to JMUEC ceased in June 1993 at the time manufacturing operations ceased. Huls now proposes to treat this water via equalization, filtration, and two granular activated carbon adsorption units in series. The treated groundwater will then be discharged to the local storm sewer via a pipe (DSN 002) at a maximum flowrate of 0.0015 million gallons per day (MGD). This storm sewer then discharges to the Perimeter Ditch that circumscribes Newark Airport.

The facility manufactured metal soaps and preservatives used in paints and specialty products for the paint industry (SIC code 2851 and 2869). This manufacturing operation ceased in June of 1993. Since that time, only blending and repackaging of the finished products occurs at the facility.

II. DESCRIPTION OF DRAFT PERMIT CONDITIONS

The proposed effluent limitations and other pertinent information regarding the draft permit are described in the Permit Summary Table and the Statement of Basis.

III. VARIANCE OR MODIFICATION OF EXISTING PERMIT

None Requested

IV. WATER QUALITY BASED PERMIT LIMITS

The Department has determined that Water Quality Based Effluent Limitations (WQBEL) are not the governing criteria at this time.

V. PROCEDURES FOR REQUESTING MODIFICATION OF A WATER QUALITY BASED EFFLUENT LIMITATION

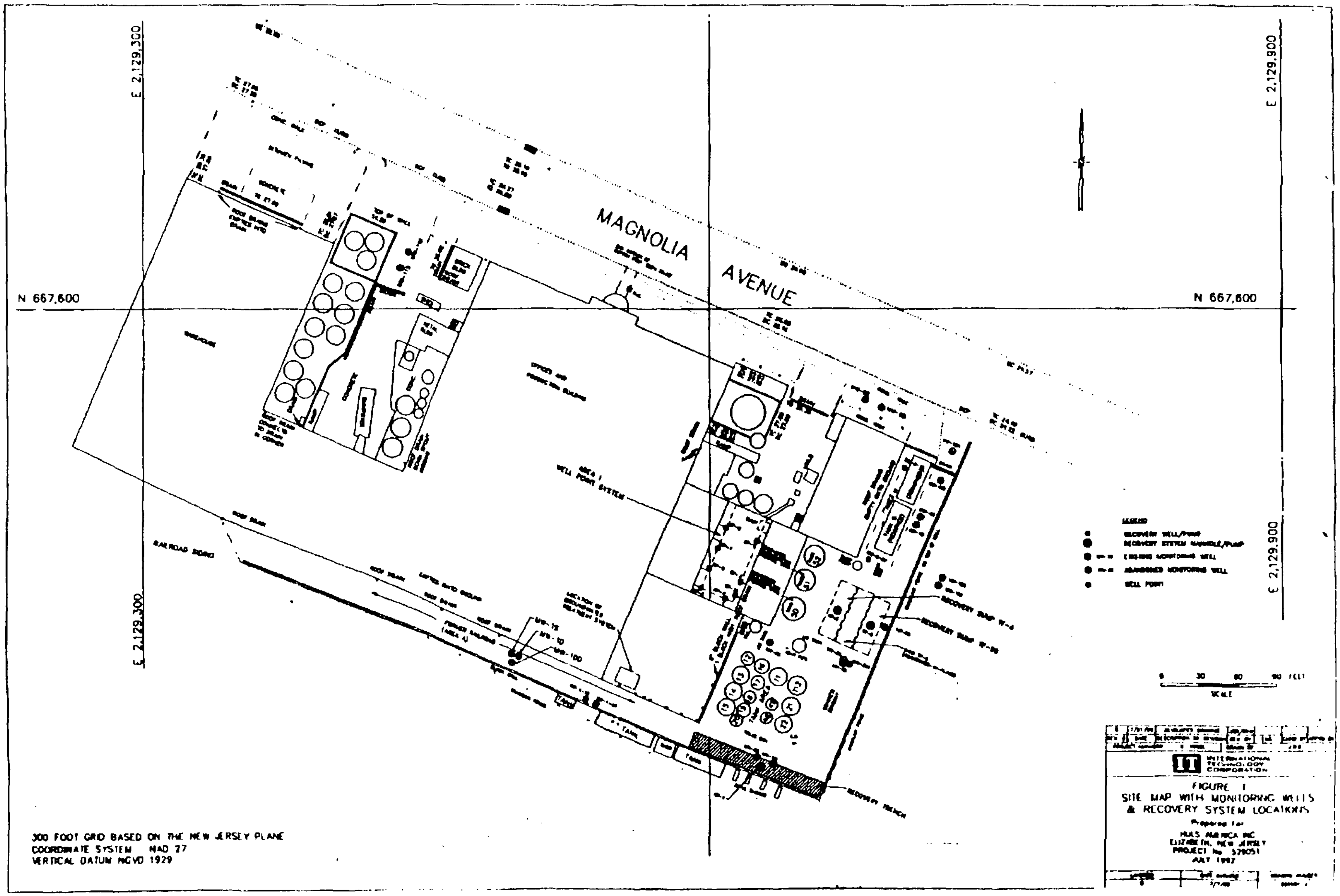
Procedures for requesting a modification to a water quality based effluent limitation are found in the New Jersey Surface Water Quality Standards, N.J.A.C. 7:9B-1.9. In accordance with N.J.A.C. 7:14A-9.6(d), any request for a modification to water quality based effluent limitation must be submitted prior to the close of the public comment period. Additional information may be obtained by contacting the Bureau of Surface Water Quality Standards at CN-423, Trenton, New Jersey 08625, (609)633-1179.

VI. PROCEDURES FOR REACHING A FINAL DECISION ON THE DRAFT PERMIT

These procedures are set forth in N.J.A.C. 7:14A-7.1 et seq. Included in the public notice are requirements for the submission of comments by a specified date, procedures for requesting a hearing and the nature of the hearing, and other procedures for participation in the final Department decision.

VII. NJDEPE CONTACT

Additional information concerning the draft permit may be obtained between the hours of 8:00 A.M. and 5:00 P.M., Monday through Friday from Asokan Ramanathan, Bureau of Standard Permitting, at (609) 292-4860.


E 2,129,300
E 2,129,900
N 667,600
N 667,600
MAGNOLIA AVENUE
E 2,129,300
E 2,129,900
0 30 60 90 FEET
SCALE
INTERNATIONAL TECHNOLOGY CORPORATION
FIGURE 1
SITE MAP WITH MONITORING WELLS & RECOVERY SYSTEM LOCATIONS
300 FOOT GRID BASED ON THE NEW JERSEY PLANE COORDINATE SYSTEM NAD 27
VERTICAL DATUM NGVD 1929

959270449

Permit Summary Table DSN (002A)

Facility: Huls America, Inc.

Discharge Serial Number (DSN) 002A | Permit No. NJ0102270 | Receiving Stream: Perimeter Discharge Ditch

Latitude: 40d 39m 50s | Wastewater Type: Treated Groundwater

Longitude: 74d 11m 55s | Long Term Average Design Flow: 0.0015 MGD | Classification: FW2-NT

River Basin: Arthur Kill

PARAMETER Conventional and Non-Conventional Pollutants mg/l		NJPDES Application	Monitoring Well Data Maximum Value [A]	Surface Water Standards Evaluation [B]	Tech.Man. Effluent Limitation [C]	Draft Permit Limitation
Flow (MGD)	avg					NL
	max	0.0015				NL
	data pts	1[a]				
Chemical Oxygen Demand (COD)	avg			No	N/A	NL
	max	16.40		Criteria	N/A	50(E)
	data pts	1[a]				
Total Suspended Solids	avg				N/A	NL
	max	20.70		40(a)	N/A	40
	data pts	1[a]				
Ammonia	avg				N/A	NL
	max	0.47		0.05 [D]	N/A	0.05
	data pts	1[a]				
pH range (S.U.)	min	6.00		No	6.5 (min)	6.5(min)
	max	9.00	12.32	Criteria	8.5(max)	8.5(max)
	data pts	1[a]				

Permit Summary Table DSN (002A)

Facility: Huls America, Inc.
Discharge Serial Number (DSN) 002A
Latitude: 40d 39m 50s
Longitude: 74d 11m 55s

Permit No. NJ0102270
Wastewater Type: Treated Groundwater
Long Term Average Design Flow: 0.0015 MGD

Receiving Stream: Perimeter Discharge Ditch
Classification: FW2-NT
River Basin: Arthur Kill

PARAMETER Volatile and Base/Neutral Compounds ug/l		NJPDES Application	Monitoring Well Data Maximum Value [A]	Surface Water Standards Evaluation [B]	Tech.Man. Effluent Limitation [C]	Draft Permit Limitation
Benzene	avg			0.150(hc)	NL	NL
	max		6300.00		7	7
	data pts					
1,2 Dichloroethane	avg			0.291(hc)	NL	NL
	max		1.20		3	3
	data pts					
1,4-Dichlorobenzene	avg			343(h)	NL	NL
	max		60.00		28	28
	data pts					
1,2-Dichlorobenzene	avg			2520(h)	77	N/A
	max		50.00		163	N/A
	data pts					
Naphthalene	avg			No	22	22
	max		110.00	Criteria	59	59
	data pts					
	avg			1.76(hc)	NL	NL
Bis(2-Ethylhexyl)Phthalate	max		31.00		30	30.0
	data pts					
Toluene	avg			6800(h)	26	26.0
	max		420.00		80	80.0
	data pts					
Xylene	avg			No		N/A
	max		60.00	Criteria		N/A
	data pts					

Permit Summary Table DSN (002A)

Facility: Huls America, Inc.

Discharge Serial Number (DSN) 002A | Permit No. NJ0102270 | Receiving Stream: Perimeter Discharge Ditch

Latitude: 40d 39m 50s | Wastewater Type: Treated Groundwater

Longitude: 74d 11m 55s | Long Term Average Design Flow: 0.0015 MGD | Classification: FW2-NT

River Basin: Arthur Kill

PARAMETER Volatile and Base/Neutral Compounds ug/l		NJPDES Application	Monitoring Well Data Maximum Value [A]	Surface Water Standards Evaluation [B]	Tech.Man. Effluent Limitation [C]	Draft Permit Limitation
Tetrachloroethylene	avg			1.09(hc)	NL	NL
	max		4.50		9	9
	data pts					
Acetone	avg			No		N/A
	max		240.00	Criteria		N/A
	data pts					
4- Methyl-2- Pentanone	avg			No		N/A
	max		870.00	Criteria		N/A
	data pts					
2-Methylphenol	avg			No		N/A
	max		260.00	Criteria		N/A
	data pts					
2- Hexanone	avg			No		N/A
	max		590.00	Criteria		N/A
	data pts					

Permit Summary Table DSN (002A)

Facility: Huls America, Inc.
Discharge Serial Number (DSN) 002A
Latitude: 40d 39m 50s
Longitude: 74d 11m 55s

Permit No. NJ0102270
Wastewater Type: Treated Groundwater
Long Term Average Design Flow: 0.0015 MGD

Receiving Stream: Perimeter Discharge Ditch
Classification: FW2-NT
River Basin: Arthur Kill

PARAMETER Metals and Toxicity pollutants ug/l		NJPDES Application	Monitoring Well Data Maximum Value [A]	Surface Water Standards Evaluation [B]	Tech. Man. Effluent Limitation [C]	Draft Permit Limitation
Total Lead	avg			3.2(c)	50	N/A
	max	1.3			100	N/A
	data pts	1[a]				
Total Mercury	avg			0.012(c)	NL	NL
	max	0.84	1700.00		1	1
	data pts	1[a]				
Total Arsenic	avg			0.017(hc)	50	50.0
	max		45.20		100	100.0
	data pts					
Total Cadmium	avg			1.1(c)	50	50.0
	max		84.00		100	100.0
	data pts					
Total Chromium	avg			11(c)	50	50
	max		97.90		100	100
	data pts					
Total Copper	avg			12(c)	50	50
	max		1000.00		100	100
	data pts					

Permit Summary Table DSN (002A)

Facility: Huls America, Inc.

Discharge Serial Number (DSN) 002A | **Permit No. NJ0102270** | **Receiving Stream: Perimeter Discharge Ditch**

Latitude: 40d 39m 50s | **Wastewater Type: Treated Groundwater** | **Classification: FW2-NT**

Longitude: 74d 11m 55s | **Long Term Average Design Flow: 0.0015 MGD** | **River Basin: Arthur Kill**

PARAMETER Metals and Toxicity pollutants ug/l		NJPDES Application	Monitoring Well Data Maximum Value [A]	Surface Water Standards Evaluation [B]	Tech. Man. Effluent Limitation [C]	Draft Permit Limitation
Total Zinc	avg			110(c)	100	100
	max		624.00		200	200
	data pts					
Total Nickel	avg			160(c)	50	50
	max		124.00		100	100
	data pts					

[A] Well monitoring data includes: Eighth Quarterly Data, dated 1992; Twelfth and Eleventh Quarterly Data, dated 1993; and Thirteenth Quarterly Data, dated 1994.

[B] Surface Water Standards Evaluation is based on a review of the permitee's discharge in comparison to the New Jersey Surface Water Quality Standards, N.J.A.C. 7:9B-1.1 et seq., and Federal Surface Water Quality Standards, 40 CFR 131.

[C] Wastewater Discharge to Surface Water Permits Technical Manual, May 1993.

[D] This value is un-ionized Ammonia as a 24-hr. average.

[E] Refer to the Fact sheet (page 13 of 16 pages).

(a) acute criteria

(c) chronic criteria

(h) Noncarcinogenic effect-based human health criteria

(hc) Human carcinogen

STATEMENT OF BASIS
FOR A DRAFT NJPDES PERMIT TO
DISCHARGE INTO THE SURFACE WATERS OF NEW JERSEY

UNDERSTANDING THE DEVELOPMENT OF EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Permit effluent limitations, monitoring requirements, and other conditions are authorized by the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., also known as the Clean Water Act, and the State Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq. These statutes are implemented by the National Pollutant Discharge Elimination System (NPDES), 40 CFR Part 122, and the New Jersey Pollutant Discharge Elimination System (NJPDES), N.J.A.C. 7:14A-1 et seq., permit programs.

Effluent limitations are developed by the following three methods:

1. **TECHNOLOGY BASED LIMITATIONS:**

Technology based limitations are authorized by Section 301 of the Clean Water Act, 40 CFR 122, N.J.S.A. 58:10A-4, and N.J.A.C. 7:14A-3.13a(1). In general, effluent limitations are based on Effluent Limitation Guidelines (ELGs), developed by the United States Environmental Protection Agency (USEPA), or on Best Professional Judgment (BPJ) in cases where ELGs are not available or appropriate. ELGs are minimum technology based requirements applicable on a nation-wide basis. ELGs consider the category of industry that produce common pollutants taking into account the specific factors unique to a particular type of industry (manufacturing process, type and quantity of pollutants generated, types of treatment facilities available to treat the pollutants, etc.). ELGs are published in 40 CFR Subchapter N. BPJ determinations are authorized by Section 402 (a)(1) of the Clean Water Act.

2. **WATER QUALITY BASED EFFLUENT LIMITATIONS:**
Water Quality Based Effluent Limitations (WQBELs) are imposed when it has been determined that limitations more stringent than technology based effluent limitations are required to meet water quality standards. WQBELs are authorized by Section 301 of the Clean Water Act, 40 CFR 122, N.J.S.A. 58:10A-4, and N.J.A.C. 7:14A-3.13a(4), and are developed to assure compliance with the New Jersey Surface Water Quality Standards, N.J.A.C. 7:9B-1.1 et seq., and the Federal Water Quality Standards, 40 CFR Part 131. The policies used to develop WQBELs are contained in the State and Federal Standards. Specific procedures, methodologies, and equations are contained in the current USEPA "Technical Support Document for Water Quality-based Toxics Control" (EPA- 505/2-90-001).

The Department is currently developing a watershed-based approach to WQBELs for pollutants, including toxic pollutants. Until such time as those limitations are developed, toxic pollutant limitations for most dischargers are determined using technology based limitations and miscellaneous effluent requirements along with a whole effluent toxicity limitation, when necessary. In addition, WQBELs for toxic pollutants from most dischargers will be imposed and/or revised as necessary when Total Maximum Daily Loads (TMDLs) are developed on a watershed specific basis. Additionally, where appropriate, the permittee is required to conduct a pollutant reduction study to determine various source reduction options, treatment options, and associated costs that would reduce toxic pollutants to a level that would not have an adverse impact on water quality.

3. **MISCELLANEOUS EFFLUENT LIMITATIONS AND CONDITIONS:**
Miscellaneous effluent limitations and conditions are authorized by Section 301 of the Clean Water Act, 40 CFR 122, N.J.S.A. 58:10A-4, and N.J.A.C. 7:14A-3.13a(2). Miscellaneous effluent limitations and conditions are applied from other federal, state, or regional statutes and regulations, when applicable. Some of these are:

1. Effluent Limitations, Technical Manual: Wastewater Discharge to Surface Water Permits, May 1993 (N.J.S.A. 13:1D-111 to 13:1D-113);
2. Oil and Grease Effluent Limitations (N.J.A.C. 7:14A-14.1 et seq.);
3. Wastewater Discharge Requirements (N.J.A.C. 7:9-5.1 et seq.);

4. Requirements of the following (where applicable):
   a. Delaware River Basin Commission (N.J.A.C. 7:9B-1.5(b)1);
   b. Interstate Sanitation Commission (N.J.A.C. 7:9B-1.5(b)2);
   c. Hackensack Meadowlands Development Commission (N.J.A.C. 19:4-6.14 to 6.15);
   d. Pinelands Commission (N.J.A.C. 7:50-6.81 to 6.87).

DESCRIPTION OF LIMITATIONS AND CONDITIONS

The monitoring conditions for **Flow** are applied pursuant to the fee calculation requirements in N.J.A.C. 7:14A-1.8 et seq. and N.J.A.C. 7:14A-3.13(a)9.i.(2) et seq.

Limitations and conditions for **Chemical Oxygen Demand (COD)** are based upon best scientific information considering N.J.A.C. 7:9-5.8. "Minimum Treatment Requirements", which specifies a maximum BOD5 reguirements of 25 mg/l for similar river basins in the vicinity, N.J.A.C. 7:9-5.5, which allows for substitution of COD or Total Organic Carbon (TOC) for BOD5, as more appropriate parameter, and by assuming that COD is normally found in wastewater at a 2:1 ratio to BOD5.

The limitaions and conditions for **pH**, **Total Suspended Solids (TSS)**, and **Ammonia** are in conformance with New Jersey Surface Water Quality Standards, N.J.A.C. 7:9B-1.1 et seq..

Toxic Parameters with Numeric Effluent Limitations and Conditions

The limitations and conditions for **Total Lead, Total Mercury, Total Arsenic, Total Chromium, Total Copper, Total Cadmium, Total Nickel, Total Zinc, Benzene, Tetrachloroethylene, 1,2-Dichloroethane,** and **Bis(2-Ethylhexyl)Phthalate** are imposed since the application influent sample results exceed or have the resonable potential to exceed the New Jersey Surface Water Quality Standards and/or the Federal Surface Water Quality Standards as indicated in more detail in the Permit Summary Table. The toxic pollutant limitations for surface water discharges that result from groundwater remediation projects are based on technically achievable levels contained in Table 2 of the "Wastewater Discharge to Surface Water Permits Technical Manual", May 1993, (here inafter) and its supporting "Basis and Background: Regulation of Toxics in NJPDES/DSW Permits" document, April 15, 1993. As explained in the Basis and Background document, the limitations for remediation projects are based on common, widely used treatment technology equivalent to activated carbon and chemical precipitation technology.

Limitations and conditions for **Naphthalene** are based on Table 2 and are being imposed since the applicant's influent sample results exceeds the table 2 limitations.

The limitations and conditions for **1,4 Dichlorobenzene,** and **Toluene** are imposed since the application influent sample results are at a level above resonable treatment levels. These limitations will be the toxic pollutant limitations discussed in the previous paragraph for surface water discharges that result from groundwater remediation projects.

Toxic Parameters without Numeric Limitations and Conditions

The Department has determined that chemical specific limitations and /or conditions for the following parameters are not necessary, at this time: **1,2-Dichlorobenzene, Xylene, Acetone, 4-Methyl-2-Pentanone, 2-Methylphenol,** and **2- Hexanone**. The treatment technology necessary to comply with the chemical specific limitations and/or conditions imposed on other parameters should result in acceptable levels of these organic compounds in the treated groundwater.

Monitoring frequencies are in accordance with the Wastewater Discharge to Surface Water Permits Technical Manual.

Modification of Monitoring Requirements

The permittee may submit a written request for a modification of the permit to decrease monitoring frequencies for limited parameters listed in Part III-B/C for DSN 002A if site specific conditions indicate the applicability of such a modification. Conditions governing requests for a reduction in monitoring frequency are outlined in the current "Wastewater Discharge to Surface Water Permits Technical Manual".

CONTENTS OF THE ADMINISTRATIVE RECORD

The following items are used to establish the basis of the Draft Permit:

1	N.J.S.A. 58:10A-1 et seq., New Jersey Water Pollution Control Act.
2	40 CFR Part 122, National Pollutant Discharge Elimination System.
3	N.J.A.C. 7:14A-1 et seq., New Jersey Pollutant Discharge Elimination System Regulations.
4	N.J.A.C. 7:9B-1 et seq., New Jersey Surface Water Quality Standards, 12/6/93.
5	40 CFR Part 131, Federal Water Quality Standards, December 1992.
7	"Field Sampling Procedures Manual", NJDEPE, May 1992.
8	"Wastewater Discharge to Surface Water Permits Technical Manual", NJDEPE, May 1993.
9	"EPA Technical Support Document for Water Quality-based Toxics Control", EPA/505/2-90-001, March 1991.
10	"Basis and Background: Regulation of Toxics in NJPDES/DSW Permits", NJDEPE, April 15, 1993.
11	NJPDES/DSW Application dated: 11/25/92
12	Site visit dated June 13, 1994.
13	
14	

QUARTERLY GROUNDWATER MONITORING REPORT NO. 9
HÜLS AMERICA INC.
ELIZABETH, NEW JERSEY
ECRA CASE NO. 85374

PREPARED FOR:

HÜLS AMERICA INC.
ELIZABETH, NEW JERSEY 07201

SUBMITTED BY:

IT CORPORATION
165 FIELDCREST AVENUE
EDISON, NEW JERSEY 08837

PROJECT NO. 529051

MARCH, 1993

EDIS/03-93/ENG/L561-rpt

Table of Contents

List of Tables

List of Figures

List of Figures (Continued)

List of Appendices

List of Attachments

Attachment	*Title*
1	Summary Result Package for Hüls America Inc., Enseco - East Project No. 027102 (1 Volume)
2	Summary Result Package for Hüls America Inc., Enseco - East Project No. 027053 (1 Volume)
3	Summary Result Package for Hüls America Inc., Enseco - East Project No. 027014 (1 Volume)
4	Analytical Support Documentation for Hüls America Inc., Enseco - East Project No. 027102 (3 Volumes)
5	Analytical Support Documentation for Hüls America Inc., Enseco - East Project No. 027053 (4 Volumes)
6	Analytical Support Documentation for Hüls America Inc., Enseco - East Project No. 027014 (1 Volume)

1.0 Introduction

This quarterly groundwater monitoring report has been prepared for the Hüls America Inc. facility in Elizabeth, New Jersey (ECRA Case No. 85374). It is being submitted in accordance with the groundwater monitoring requirements described in the September 11, 1992 Performance Monitoring Plan submitted by IT Corporation (IT) on behalf of Hüls America Inc. This plan was approved by the NJDEPE in their letter dated February 24, 1993. The Performance Monitoring Plan was based upon the following: Items 5 and 6 of the New Jersey Department of Environmental Protection and Energy's (NJDEPE's) Letter of Conditional Cleanup Plan Approval dated May 31, 1990; Item III.C of the NJDEPE's October 25, 1991 letter regarding the first three groundwater monitoring reports; and IT's December 12, 1991 response on behalf of Hüls America Inc.

This submittal contains the results of monitoring the following activities from October 1992 through January 1993:

- Groundwater quality (ninth quarter);
- Groundwater elevations (ninth quarter); and
- Groundwater Remedial System operation (first quarter).

The Groundwater Remedial System (GRS) was installed during soil cleanup activities in 1991 as documented in IT's July, 1992 "Final GRS Construction Report". It was started up on a trial basis in April 1992, and full-scale operation began on October 27, 1992. The GRS pumps groundwater from four recovery wells (two shallow, two deep), two recovery sumps, one recovery trench and eight horizontal well points (basement level). Recovered groundwater is treated by gravity separation and carbon filtration prior to use as process contact wastewater in the manufacturing plant. After use, it is treated in the plant's wastewater treatment system prior to discharge to the Joint Meeting of Essex and Union Counties treatment works.

Quarterly groundwater monitoring at the Elizabeth site began in September, 1990 after receipt of the Conditional Cleanup Plan Approval Letter. Soil cleanup activities were completed from February to September, 1991, and reported in the December, 1991 "Final Soil Cleanup Report."

2.0 Ninth Quarterly Groundwater Quality Monitoring Report

This chapter presents the results of the ninth round of quarterly groundwater sampling and analysis, which is also the first quarterly groundwater quality monitoring event for 1993. It is also the first groundwater sampling event since operation of the GRS began on October 27, 1992. As noted in the conclusion of the November 1992 Eighth Quarterly Groundwater Monitoring Report and approved by NJDEPE, this quarter was extended one month from December 1992 to January 1993 in order to align groundwater sampling quarters with GRS operational quarters.

IT sampled a total of 14 monitoring wells for this ninth round of quarterly monitoring as per Item III.C1 in the NJDEPE's October 25, 1991 letter, which requires that all wells (except MW-5S, MW-5D, MW-6D, MW-7D, MW-11D and MW-12S) "be sampled every first quarter for VOs and BNs with a forward library search, total and dissolved priority pollutant metals, polychlorinated bi-phenyls (PCBs), pH and total dissolved solids (TDS)." This represents an expanded list of analytical parameters for an expanded list of monitoring wells, compared to the NJDEPE's requirements for the subsequent three quarters (see Item III.C.2 of NJDEPE's letter). Since the last time this expanded quarterly sampling and analyses was performed was for the fifth quarterly monitoring period (October - December 1991), it was conducted again for this ninth quarterly monitoring period (i.e. one year later).

2.1 Groundwater Sample Collection

On January 26, 27 and 29, 1993 the following 14 monitoring wells were sampled: MW-1S, MW-1D, MW-1DD, MW-3S, MW-3D, MW-3DD, MW-4S, MW-4D, MW-6S, MW-7S, MW-10S, MW-10D, MW-13S and MW-13D. Monitoring Well MW-8S contained free product and was therefore not sampled.

The monitoring wells were sampled in accordance with the NJDEPE Field Sampling Procedures Manual dated May 1992. Each well was first measured with an interface probe for free product (if any), static water level and total depth to determine the volume of the water column. Prior to obtaining samples, each well was purged approximately three times the volume of the water column using a peristaltic pump at a rate of approximately one gallon per minute.

Groundwater samples were collected using either laboratory-cleaned dedicated stainless steel bailers or Teflon bailers. During sample collection, IT measured pH using an Orion 230-A pH meter. Samples were labeled at the field location and placed into transport coolers containing ice bags. An on-site field blank of the sampling equipment was obtained for each sampling date. The samples that were analyzed for dissolved metals were filtered in the field by the sampling technician using a 0.45 micron filter. The samples that were analyzed for total metals were not filtered. Travel blanks and chain-of-custody documentation accompanied the samples to the NJDEPE - certified laboratory for analysis (Enseco Incorporated - Somerset, New Jersey). The analyses requested and performed by the laboratory are listed on Table 1.

2.2 Results and Discussion

Table 1 provides a summary of the analytical results for the ninth quarterly sampling. Table 2 presents the site-specific NJDEPE groundwater cleanup criteria established in the May 31, 1990 Letter of Conditional Cleanup Plan Approval, and general NJDEPE action limits at that time. The analytical results are included with the ECRA QA/QC Packages (Attachments 1 through 6), which are bound as separate attachments to this report. The results for all analytical parameters are discussed in the following sub-sections.

As stated previously, the ninth quarterly groundwater monitoring episode was conducted per Item III.C.1 of NJDEPE's October 25, 1991 letter, which requires an expanded list of analytical parameters annually. Accordingly, samples from 12 monitoring wells were analyzed for the following parameters: volatile organics and base neutrals (with forward library searches), total and dissolved priority pollutant metals, PCBs, pH and TDS. Consistent with the fifth quarter, samples from the two extra deep wells, MW-1DD and MW-3DD, were analyzed for volatile organics, total mercury, dissolved priority pollutant metals, pH and TDS.

2.2.1 Volatile Organics

Detectable concentrations of volatile organics encountered during ninth quarter monitoring are compared to the applicable, previous volatile organic results from the eighth quarter and fifth quarter sampling episodes. The volatile organic compound analysis and volatiles library search (15 tentatively identified compounds) was performed by EPA Method 524.2 Rev. I and EPA Method 524 in order to attain appropriate detection limits for benzene and chlorobenzene.

2.2.1.1 Benzene

Of the 14 monitoring well samples analyzed, monitoring well MW-1D exhibited the highest concentration of benzene at 6,300 ppb. The lowest result was from MW-6S, with a concentration remaining below the detection limit. The benzene concentration in MW-1D increased from 530 ppb to 6300 ppb. MW-3DD and MW-4D concentrations doubled over the previous monitoring period to 62 ppb and 680 ppb, respectively. In MW-1S, MW-1DD and MW-4S, the benzene concentrations decreased from their previous levels to 15 ppb, 14 ppb and 12 ppb, respectively. The other eight monitoring well benzene concentrations fluctuated slightly, and are similar to prior monitoring period results.

2.2.1.2 Chlorobenzene

Of the 14 monitoring wells sampled, five exhibited detectable levels of chlorobenzene, and four were above the NJDEPE cleanup criteria of 4.0 ppb. Monitoring well MW-13D exhibited the highest concentration of chlorobenzene at 140 ppb, a marked decrease from 200 ppb detected during the fifth quarter sampling round (most recent sampling date). Monitoring wells MW-3D and MW-4S both had concentrations of 34 ppb. MW-3D decreased from 52 ppb, while MW-4S increased from 16 ppb as detected during eighth quarter monitoring. Monitoring well MW-10D decreased from 5.4 ppb to 3.2 ppb, and monitoring well MW-7S had a concentration of 8.2 ppb, a slight increase from 6 ppb detected in the December 1988 Phase II sampling round, and the non-detectable chlorobenzene result from the first quarterly sampling in September 1990.

2.2.1.3 Other Cleanup Criteria

A site specific cleanup limit for the combined total concentrations of 1,2-dichlorobenzene, ethylbenzene, toluene and naphthalene has been set at 50 ppb. Two of the monitoring wells sampled during this monitoring period do not meet the 50 ppb cleanup limit. MW-3S increased from 35 ppb to 118 ppb, and MW-3D increased from 28 ppb to 68 ppb.

2.2.2 Base Neutral Compounds

Of the 12 wells analyzed for base neutrals with a forward library search (BN+15) this quarter, the only sample above NJDEPE's action limit of 50 ppb was MW-3S, which exhibited a total concentration of 85.9 ppb. This is an increase from the previous BN+15 results of 65 ppb detected in MW-3S during the first quarterly monitoring event (MW-3S was dry during the fifth quarterly event).

2.2.3 Total Priority Pollutant Metals

Four of the 14 wells analyzed for total mercury contained concentrations exceeding the NJDEPE cleanup criteria of 0.002 ppm. The sample from MW-3D showed the highest concentration of total mercury at 1.1 ppm; however, this is relatively unchanged from previous sampling results. Monitoring wells MW-1S, MW-1DD and MW-7S also exceeded the 0.002 ppm standard at 0.2 ppm, 0.04 ppm and 0.0029 ppm, respectively.

MW-3D and MW-7S exceeded the cadmium action limit of 0.01 ppm at 0.41 ppm and 0.16 ppm, respectively. This represents a decrease in the number of wells exceeding the total cadmium action limit, from six to two. Wells exceeding the lead action limit of 0.05 ppm were MW-1S (0.20 ppm), MW-3D (1.1 ppm) and MW-10S (0.53 ppm). This also reflects a decrease in the number of wells exceeding the target action limit for a metal, from nine to three.

One well contained a total chromium concentration over the target action limit of 0.05 ppm: MW-3D at 0.13 ppm. During the fifth quarter, four wells contained total chromium concentrations over the target action limit (maximum 0.099 ppm in MW-10S).

2.2.4 Dissolved Priority Pollutant Metals

All 14 wells were analyzed for dissolved priority pollutant metals. All wells showed concentrations of non-detectable or below the NJDEPE action limit. No wells exhibited detectable levels of dissolved mercury.

2.2.5 PCBs/Pesticides

None of the 12 site wells analyzed had detectable levels of pesticides or PCBs. This is consistent with the previous sampling event for PCBs/pesticides (fifth quarter).

2.2.6 Total Dissolved Solids (TDS) and pH

TDS results ranged from a minimum of 520 ppm in MW-1S to a maximum of 2120 ppm in MW-4D. During the fifth quarterly monitoring event, TDS ranged from 380 ppm in MW-3DD to 2460 ppm in MW-4D. The pH results ranged from a minimum of 6.53 in MW-4D to a maximum of 12.32 in MW-3DD. This is consistent with the pH range of 6.15 (MW-8S) to 11.95 (MW-1DD) in the fifth quarter.

2.2.7 Free Product

A free product thickness of 0.12 inches was measured in MW-8S during the ninth quarterly sampling event on January 26, 1993. This result is a decrease from the eighth quarters' measurement of 8.04 inches, most likely because monitoring well MW-8S was periodically bailed during this first quarter of GRS operation (see Section 4.1).

Monitoring well MW-3S did not contain any free product on the ninth quarterly sampling date (January 29, 1993). This is a decrease of 0.12 inches from last quarter and is also potentially attributable to the manual bailing conducted this quarter (see Section 4.1).

2.3 Historical Review of Site Groundwater Quality

As stated in Item III.4 of the Performance Monitoring Plan, chronological plots of all groundwater results for the Elizabeth site would be presented in each quarterly monitoring report after GRS operation began. Such plots are provided for each well sampled in Appendix A, and include data from the initial ECRA investigations (Phase 1 - July 1986; Phase 2 - December 1988; and additional - November 1989) as well as the preceding eight quarterly monitoring events (September 1990 - September 1992). It should be noted that during this seven year period, three wells were closed due to the June 1991 construction of the groundwater recovery system and the installation of a new stormwater collection pipe (MW-2S, MW-2D and MW-9S). Six other wells (MW-5S, MW-5D, MW-6D, MW-7D, MW-11D and MW-12S) were eliminated from further monitoring in October 1991 by the NJDEPE based on previous results.

The results of reviewing these chronologic plots of time versus concentration against the site-specific cleanup criteria established by NJDEPE (Table 2) are summarized in the following sections.

2.3.1 Benzene

As established in the Conditional Cleanup Plan Approval Letter, the site-specific groundwater cleanup target for benzene is 1.0 part per billion (ppb). Prior to GRS operation, the maximum benzene concentration in a groundwater sample from a well not containing free product was 3500 ppb in MW-9S. After one quarter of GRS operation, the maximum benzene concentration detected was 6300 ppb in MW-1D.

As indicated by the chronological plots of benzene concentrations, there is no definite upward or downward trend of benzene contamination for the site. The MW-10S benzene plot shows an increasing contamination trend from July 1986 to April 1991 and decreasing thereafter. Site benzene concentrations seem to have peaked during the April 1991 monitoring period, and then decreased until GRS startup. Even though some of the wells do not show this same plot characteristic, benzene contamination levels remained relatively constant for the site collectively. The consistency of benzene concentrations would be consistent with the low groundwater gradient at the site. Three of the site deep wells (MW-1D, MW-3D and MW-4D) showed benzene concentration increases after GRS startup from previously non-detectable levels.

2.3.2 Chlorobenzene

The site-specific groundwater cleanup target for chlorobenzene is 4.0 ppb. As indicated in the chronological plots of dichlorobenzene concentrations three distinct trends form. The "Extra-

Deep" (DD) wells have remained well below the site cleanup target level, shown in plots MW-1DD and MW-3DD. The shallow monitoring well system shows a decreasing trend in chlorobenzene concentrations over time as indicated by the MW-1S and MW-4S plots. The chlorobenzene concentration plots of the deep wells show relatively stable contaminant levels as indicated in MW-3D, MW-4D, MW-10D and MW-13D.

2.3.3 Other Cleanup Criteria

The site-specific combined cleanup limit for the combined total concentrations of 1,2-dichlorobenzene, ethylbenzene, toluene and naphthalene is 50 ppb. To date none of the "Extra-Deep" (DD) wells have exhibited combined concentrations above the cleanup limit. MW-3D is the only deep well to have combined concentrations above the cleanup limit. Concentrations decreased over time to non-detectable levels until GRS start up. Upon GRS startup combined levels increased to 68 ppb. The shallow wells collectively do not show a definite site trend, however, individual wells seem to show individual trends (e.g. MW-1S, MW-3S, MW-4S).

2.3.4 Total Metals

In the shallow wells, total mercury levels increased in approximately one-third of the wells but not above the target action level. The two wells with mercury concentrations over the action level show a decreasing trend (MW-7S, MW-8S). As indicated by the chronological plots of total mercury concentrations, there is a general trend upward in concentration and then decrease to at or below the recommended guidelines of 0.002 ppm. This is shown in MW-1S where the total mercury recorded as high as 11 ppm then decreased to 0.02 ppm. This trend is also seen in MW-6S where total mercury recorded as high as 0.008 ppm then gradually dropping to .0014 ppm. The only shallow well that exhibited an increasing trend was MW-2S, but this well was abandoned in June 1991 (due to recovery trench construction) after its peak of 0.008 ppm.

Four of the seven deep wells indicate initial increases then decreases in total mercury. Of those, MW-3D was the only well with a concentration (1.1 ppm) still above the action limit of 0.002 ppm.

Of the other priority pollutant metals, arsenic, cadmium, chromium and lead concentrations have exceeded action limits. Arsenic concentrations exceeded the action limit only once, in MW-4D on September 20, 1990 at a concentration of 0.056 ppm by 6 ppb. Cadmium, chromium and lead concentrations were highest in MW-8S during the first quarter monitoring period (cadmium 3.6 ppm, chromium 0.93 ppm, lead 3.1 ppm). Since that time cadmium, chromium and lead levels decreased until January 29, 1993 when concentrations increased to (cadmium 0.41 ppm.

chromium 0.13 ppm, lead 1.1 ppm) in MW-3D.

2.3.5 Dissolved Metals

In the shallow wells, dissolved mercury concentrations were non-detectable or decreased to non-detectable from 1986-1993. Wells MW-1S and MW-8S have exhibited dissolved mercury concentrations over the 0.002 ppm action limit 0.0034 ppm and 0.022 ppm, respectively, but both showed non-detectable in this ninth quarterly monitoring event. Dissolved mercury levels were generally nondetectable in the deep wells throughout the monitoring history at this site.

Two monitoring wells have exhibited dissolved concentrations of priority pollutant metals above the total priority pollutant metals action limits. Monitoring well MW-4S had a barium concentration of 1.4 ppm on December 27, 1988, and MW-8S had a cadmium concentration of 0.014 ppm on September 21, 1990 (MW-8S historically has contained free product).

2.3.6 Total Dissolved Solids and pH

In the shallow wells, TDS levels remained relatively the same or decreased from 1986-1993 with the exception of MW-4S which increased nearly 80% during this period. TDS trends in the deep wells varied, with a nearly equal number of wells showing increases as decreases.

During the same period, pH remained relatively stable (near 7) in the shallow wells. In the deep wells, pH levels were generally near 6.8. Two deep wells exhibited pH decreases, with the most notable being from 11.8 to 6.8 in MW-1D. In MW-7D, pH decreased from 10.1 to 7.4 between September 1990 and January 1991 when this well was eliminated from further monitoring.

3.0 Ninth Quarterly Groundwater Elevation Monitoring Report

As specified in the Performance Monitoring Plan, groundwater levels in 17 monitoring wells at the Elizabeth site were measured periodically throughout the first quarter of GRS operation. The objective of this activity was to determine the effectiveness of the GRS in establishing hydraulic control at the site.

3.1 Groundwater Level Measurements

A total of 16 sets of water level measurements were collected between October 30, 1992 and January 26, 1996 from 17 shallow and deep groundwater wells as shown on Table 3. In accordance with the approved Performance Monitoring Plan, water levels were measured at a frequency of approximately twice per week for the first month, and once per week thereafter. Groundwater elevations were calculated from these water level measurements, and the data from each set of elevation measurements was incorporated into the shallow and deep groundwater contour maps presented as Figures 1 through 32.

3.2 Results and Discussion

The contour maps generated for each of the 16 level measurements during the first quarter of GRS operation were compared to the most recent contours prior to GRS operation (September 1992). Generally, the contour maps indicate localized hydraulic control in the shallow zone, and no significant effect on the deep zone.

In the shallow zone, a localized zone of depression is evident around shallow recovery well RW2-15, even though the other shallow recovery well (RW1-15) has pumped more groundwater. This is likely due to the fact that RW2-15 is in former Area H, which was a major excavation/backfill area in the soil cleanup. The general easterly shallow groundwater flow direction is consistent with the pre-pumping shallow contours.

The deep groundwater contour maps are based on fewer data points than the shallow maps due to the fact that there are less deep wells. Also, the deep groundwater table is relatively flat and minimal elevation changes (e.g. seasonal variations) produce significant mapping effects. Hence, the overall direction of deep groundwater flow appears to change regularly.

The lack of apparent hydraulic influence around the two deep recovery wells (RW1-45 and RW2-37) correlates with the limited groundwater volumes pumped (see Table 4).

4.0 First Quarterly Groundwater Remedial System Operations Report

As outlined in the Performance Monitoring Plan, operational records and a performance evaluation would be included in each quarterly monitoring report. This section summarizes the procedures used to monitor both the recovery and treatment subsystems that comprise the GRS.

4.1 Recovery System

As described in the July 1992 "Final GRS Construction Report," the recovery system at the Elizabeth site is comprised of the following elements, depicted on each of the contour maps discussed previously (Figures 1-32):

- 2 shallow recovery wells (RW 1-15 and RW2-15);
- 2 deep recovery wells (RW1-45 and RW2-37);
- 1 recovery trench (110 feet long; 10 feet deep);
- 2 recovery sumps (TF-4 and TF-20);
- 8 horizontal well points through basement walls (WP-1 through WP-8); and
- 1 monitor well bailed manually (MW-8S).

MW-8S, a 2-inch diameter monitoring well, was originally intended as a recovery well, but due to pump constraints for such a small well, it is manually bailed when groundwater elevations are measured (16 events during this four month period). Table 4 summarizes manual free product recovery during the ninth quarter. Product or sheens were noted in MW-3DD once, MW-3S ten times, and MW-8S 13 times. The bailed product was placed in a covered drum on site.

Other than MW-8S, the recovery system is monitored by plant personnel approximately two to three times per week. Monitoring activities include: visually inspecting each recovery well/pump housing and recording flow rates from each recovery pump and the main return pump located between the two carbon treatment units. Based on plant records, flow volumes from each recovery pump are provided in Table 5. As indicated, a total of 130,903 gallons of groundwater were pumped into the treatment system between October 27, 1992 (start-up) and January 26, 1993 (end of first quarter). Flow rates from the recovery system to the treatment system, measured at the main return pump decreased from approximately 20 gallons per minute (gpm) on November 4, 1992 to approximately 10 gpm as of January 6, 1993.

4.2 Treatment System

Also as described in the "Final GRS Construction Report," the treatment portion of the Elizabeth GRS consists of a 20,000-gallon aboveground equalization tank (T-51), two 1800-pound carbon units in series, and a 20,000-gallon aboveground storage tank for treated water (T-50).

The treatment system is also monitored by plant personnel. Monitoring activities include: checking the strainers/filters at T-51 and the carbon units; changing filters; checking for free product in T-51; reading pressure gauges located prior to and in the carbon units; checking for system leaks in the tanks, pumps and piping; and checking the pumps for proper operation. The following maintenance items were noted on the treatment system during the first quarter of GRS operation:

- Certain recovery pumps running intermittently initially;
- Replacement of four filters at the carbon unit inlet;
- Replacement of two in-line strainers at the carbon unit inlet;
- Replacement of the Tank 51 filter twice;
- Monitor well caps missing (being replaced);
- Continuous running of main return pump, even when tank 51 empty (corrected).

As another check of the treatment system, the influent and effluent from the active carbon unit must be sampled every quarter. On December 15, 1992, samples of the treatment system influent and effluent were collected from the carbon unit inlet valve and exit valves, respectively. Both samples were analyzed for volatile organics by EPA Method 624 (GC/MS). Influent results indicated detectable levels of benzene and chlorobenzene. The effluent results were all non-detectable. This indicates satisfactory removal of volatile organic compounds. Results are provided in Appendix B.

4.3 Performance Evaluation

Based on groundwater elevation data as depicted by groundwater contour mapping, in conjunction with recovery well pump volume data, it is recommended that the high liquid level switches be adjusted to maximize recovery well influence on groundwater at all shallow and deep recovery points. Furthermore, a probe maintenance program should be implemented to insure that all probes are functioning properly.

5.0 Conclusions and Recommendations

Based on the data collected during the first four months of GRS operation the following can be concluded:

1. The shallow groundwater recovery system has captured a significant quantity of groundwater (nearly 130,000 gallons), which is the majority of the volume pumped.

2. Localized shallow hydraulic control is evident near RW2-15, and to a lesser degree, at the two recovery sumps and recovery trench. Formerly steep gradients near the recovery trench have been diminished, indicating reduced offsite groundwater migration.

3. The deep groundwater recovery system does not appear to have a significant effect based on the contour maps, although it pumped over 1,100 gallons during this period.

4. The treatment system effluent analytical results (non-detectable volatile organic concentrations) indicate that the carbon treatment system is removing volatile organic compounds from recovered groundwater as intended.

Also based on the data presented herein, the following actions are recommended:

1. Inspect all recovery well probes and clean/adjust as necessary to maximize pump recovery time, and hydraulic control. Evaluate high level probe switches elevations with respect to historical groundwater conditions.

2. Continue monitoring groundwater elevations bi-weekly, and groundwater/influent/effluent concentrations quarterly. Continue inspecting the recovery system daily, and initiate daily recovery pump meter readings.

3. Investigate additional groundwater monitoring points, such as the four recovery trench PVC clean-outs,the recovery trench sump and the horizontal well points in the Cat Room.. This may result in more realistic contour maps.

The second GRS operating quarter (and tenth groundwater monitoring quarter) is February, March and April 1993. The next quarterly sampling event is scheduled for April 1993. Due to the time needed forsample analysis and data evaluation, the next quarterly report will be submitted approximately 60 days after sampling.

TABLE 1 (Page 1 of 3)
SUMMARY OF NINTH QUARTERLY ANALYTICAL RESULTS
HULS AMERICA INC. – ELIZABETH, NEW JERSEY

Sample I.D.	MW-1S	MW-1D	MW-1DD	MW-3S	MW-3D	MW-3DD	MW-4S	MW-4D	MW-6S	MW-7S	MW-10S	MW-10D	MW-13S	MW-13D
Sample Date	01/27/93	01/27/93	01/27/93	01/29/93	01/29/93	01/27/93	01/26/93	01/26/93	01/26/93	01/27/93	01/26/93	01/26/93	01/26/93	01/26/93
Analytical Parameters:														
pH (Std. units)	7.29 *	6.8 W	8.44 *	7.1 W	7.1 W	12.32 *	7.13 *	6.53 *	7.13 *	6.55 *	6.93 *	6.68 *	6.85 *	6.77 *
Total Dissolved Solids (ppm)	520 B	1130 B	540 B	1200 B	1150 B	1010 B	920	2120	840	620 B	840	1110	650	850
PP Metals-total (ppm)														
Antimony	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	0.0097	ND	NA	0.010	0.014	NA	ND	ND	0.0085	0.016	ND	ND	0.0069	ND
Beryllium	ND	ND	NA	ND	0.0039	NA	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	0.0052	ND	NA	ND	0.41	NA	ND	ND	ND	0.16	ND	ND	ND	ND
Chromium	ND	ND	NA	ND	0.13	NA	ND	0.020	0.023	0.015	0.010	0.012	ND	0.026
Copper	0.040	ND	NA	0.010	0.86	NA	ND	0.016	0.046	0.043	0.047	ND	0.018	ND
Lead	0.20	0.0078	NA	0.0095	1.1	NA	0.0063	ND	0.046	0.018	0.053	ND	0.0056	ND
Mercury	0.20	0.0015	0.040	0.00045	1.1	ND	ND	ND	0.0014	0.0029	0.0018	ND	ND	ND
Nickel	ND	ND	NA	ND	1.2	NA	ND	ND	0.065	ND	ND	ND	ND	ND
Selenium	ND	ND	NA	ND	ND G	NA	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND G	ND G	NA	ND	ND	NA	ND	ND G	ND	ND	ND	ND G	ND	ND G
Zinc	0.12	ND	NA	ND	1.5	NA	ND	ND	0.076	0.077	0.095	ND	0.026	ND
PP Metals-dissolved (ppm)														
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	0.010 S	ND	ND	0.016	ND	ND G	ND	ND	ND	0.024 S	ND	ND	0.0094	ND
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	0.31	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND G	ND	ND G	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND G	ND	ND	ND	ND G	ND	ND	ND	ND	ND	ND
Zinc	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES: All data (except as noted below) from Enseco Inc. Analytical Results Package for Huls America Inc., Enseco-East Project No. 027102.
* – Results are from IT Corp field analysis records.

LEGEND: See Page 3.

TABLE 1 (Page 2 of 3)
SUMMARY OF NINTH QUARTERLY ANALYTICAL RESULTS
HULS AMERICA INC. – ELIZABETH, NEW JERSEY

Sample I.D.	MW-1S	MW-1D	MW-1DD	MW-3S	MW-3D	MW-3DD	MW-4S	MW-4D	MW-6S	MW-7S	MW-10S	MW-10D	MW-13S	MW-13D
Sample Date	01/27/93	01/27/93	01/27/93	01/29/93	01/29/93	01/27/93	01/26/93	01/26/93	01/26/93	01/27/93	01/26/93	01/26/93	01/26/93	01/26/93
Analytical Parameters: (unit: ppb)														
Pesticides/PCB's														
Endosulfan sulfate	NA	NA	NA	NA	NA	NA	ND	ND	ND	NA	ND	ND	ND	ND
Aroclor 1016	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND d	ND	ND	ND	ND
Aroclor 1221	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Base Neutrals														
1,4-Dichlorobenzene (1)	ND	ND	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	5.0 J
1,2-Dichlorobenzene (1)	ND	ND	NA	ND	18	NA	ND	2.4 J	ND	ND	ND	2.7 J	ND	32
Isophorone	ND	ND	NA	ND	1.5 J	NA	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene (1)	3.8 J	ND	NA	82	2.0	NA	ND	ND	ND	ND	15	ND	3.4 J	ND
Acenaphthene	2.7 J	ND	NA	1.0 J	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	2.3 J	ND	NA	1.4 J	ND	NA	ND	ND	ND	ND	ND	ND	1.0 J	ND
Phenanthrene	3.9 J	ND	NA	ND	2.7 J	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	1.8 J	ND	NA	ND	1.2 J	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	1.1 J	ND	NA	ND	1.4 J	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-Ethylhexyl)phthalate	5.3 J	ND	NA	1.5 J	20	NA	2.2 J	ND	ND	1.4 J	1.0 J	1.0 J	2.2 J	1.0 J
Total NBS search for BN	498	16.9	NA	54	390	NA	156	1457	NA	8996	335	54	163	292

NOTE: (1) These analytes were detected in the volatile organics scan as well as base neutrals. Only base neutral results are listed.
LEGEND: See Page 3.

Project No. 529051/028

TABLE 1 (Page 3 of 3)
SUMMARY OF NINTH QUARTERLY ANALYTICAL RESULTS
HULS AMERICA INC. – ELIZABETH, NEW JERSEY

Sample I.D.	MW-1S	MW-1D	MW-1DD	MW-3S	MW-3D	MW-3DD	MW-4S	MW-4D	MW-6S	MW-7S	MW-10S	MW-10D	MW-13S	MW-13D
Sample Date	01/27/93	01/27/93	01/27/93	01/29/93	01/29/93	01/27/93	01/26/93	01/26/93	01/26/93	01/27/93	01/26/93	01/26/93	01/26/93	01/26/93
Analytical Parameters: (unit: ppb)														
Volatile organics														
Benzene	15 U	6300 UD	14 Ud	140 d	340 U	62 U	12 U	680 U	ND	41 U	26 U	13 d	41 d	25 U
n-Butylbenzene	ND	ND	ND	19	ND	7.7	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	7.8	ND	ND	17	ND	ND	4.6	ND	ND	ND	21	ND	13	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	4.3	ND	ND	ND	16	ND	11	5.3
Chlorobenzene	ND	ND	ND	ND	34	ND	34	ND	ND	8.2	ND	3.2	ND	140
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	1.8	ND	ND	6.4	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.9	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	36	48	13	2.4	ND	ND	ND	4.6	ND	ND	ND
1-Methylethylbenzene	23	ND	ND	33	ND	10	10	ND	ND	ND	46	ND	12	ND
p-Isopropyltoluene	7.5	ND	ND	20	ND	5.4	ND	ND	ND	ND	ND	ND	8.6	ND
n-Propylbenzene	43	ND	1.4	54	29	14	13	ND	ND	ND	74	ND	16	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.9	ND	ND	ND	ND
1,2,4-Trimethylbenzene	130	ND	6.4	160	180	160	3.4	ND	ND	4.0	ND	ND	ND	ND
1,3,5-Trimethylbenzene	13	ND	2.7	ND	59	43	ND	ND	ND	1.3	ND	ND	ND	ND
o-Xylene	6.3	ND	ND	ND	ND	24	ND	ND	ND	2.5	ND	ND	ND	ND
m,p-Xylene	6.2	ND	ND	ND	32	12	ND	ND	ND	1.9	ND	ND	ND	ND
Total NBS search for VOC	750	NA	16.1	682	82	368	57.8	1169	3.1	36.3	33.7	124	294	280

LEGEND:

NA–Not analyzed for.
ND–Not detected at the detection limit.
W–Overaged.
B–Compound is also detected in the blank.
D–Compound quantitated using a secondary dilution.
U–All reporting limits raised due to high levels at target analytes.
J–Result is detected below the reporting limit or is an estimated concentration.
G–Reporting limit raised due to matrix interference.
S–Reporting value determined by method of standard addition.
d–Reporting limits raised due to matrix interferences.

Project No. 529051/028

TABLE 2
NJDEPE GROUNDWATER CLEANUP PLAN CRITERIA AND TARGET LIMITS
HÜLS AMERICA INC.
ELIZABETH, NEW JERSEY SITE
CASE NO. 85374

Based on NJDEPE Cleanup Plan Approval Letter dated May 31, 1990, the groundwater cleanup criteria for the Elizabeth site are as follows:

Compounds	Cleanup Criteria (ppb)
Benzene	1.0
1,2-Dichlorobenzene	*
Chlorobenzene	4.0
Ethylbenzene	*
Toluene	*
Naphthalene	*

Note: * - Combined total shall not exceed 50 ppb

At the time that the Elizabeth Cleanup Plan Approval letter was issued, the following list of NJDEPE target groundwater action limits was to be used on a case by case basis:

Compounds	Action Limits (ppb)
Metals:	
Antimony	-
Arsenic	50
Barium	1.000
Beryllium	-
Cadmium	10
Chromium	50
Copper	1.000
Lead	50
Mercury	2
Molybdenum	-
Nickel	-
Selenium	10
Silver	50
Thallium	-
Vanadium	-
Zinc	5,000
Organics:	
Total Base Neutral Extractables	50
Total Acid Extractables	50
Total Petroleum Hydrocarbons	1.000
Total PCBs	1

EDIS/3-93/ENG/L561-T2

959270483

hüls

HÜLS AMERICA INC.

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March 29, 1996

Mr. Michael Buriani
New Jersey Department of Environmental Protection
Division of Hazardous Waste Management
BEECRA Cleanup Oversight Section
401 East State Street
CN-028
Trenton, New Jersey 08625-0028

RE: ISRA Case
Hüls America Inc. Elizabeth Facility
ISRA Case No. 85374

Dear Mr. Buriani:

This letter is to confirm our phone conversation on March 28, 1996 addressing the above referenced ISRA case. As we discussed, Hüls America Inc. (HAI) will proceed with demolition of the main production building and tank farm areas on the south side of Magnolia Avenue leaving the warehouse section of the structure in place. The warehouse on the north side of Magnolia Avenue will also remain in place. Based on our current project schedule, we expect the demolition to be complete during September 1996.

This project will impact our ISRA activities and reporting as follows:

1. The quarterly ground water report and the proposed activities for delineating soils requested in the NJDEP letter dated February 2, 1996 will be submitted by HAI on Friday, April 5th. The submission will identify activities requested by NJDEP that HAI would like to delay due to the pending demolition project.

2. HAI plans to sell the property on the north side of Magnolia Avenue prior to completing remedial activities on the south side of Magnolia Avenue. Separation of the case into two individual filings for each side of Magnolia Avenue is not necessary. HAI can proceed with work in the warehouse location (Area D) and propose appropriate administrative controls such as a Declaration of Environmental Restriction (DER) after NJDEP requirements have been satisfied.

3. The existing ground water treatment system will be relocated before July 1996 and HAI plans to operate the system through the course of the demolition project. Shut down periods will be unavoidable but HAI will attempt to minimize interruption to system operation. HAI is also in contact with NJDEP personnel overseeing the site surface water discharge permit to coordinate this portion of the project.

4. Submission of a Remedial Action Workplan (RAW) will be added to the project schedule to address deferred remedial requirements from the original NJDEP Cleanup Plan approval letter. This RAW will address soil remediation beneath the existing building including expansion of the ground water recovery system.

5. Additional tasks will be added to the overall project schedule and included in the April 5th submission. The schedule will include submission of all soil and ground water reports on a quarterly basis.

We appreciate your guidance in this matter. Please review this information and contact me at 908-981-5042 if you have any questions or comments.

Sincerely,

John Wnek, P.E.
Director
Environmental Affairs

JW/ab

cc: J. Gilland (IT)
J. Hodgson
P. O'Brien

10

CREA
NOVA
A Hüls Group Company

January 14, 1998

Mr. Michael Buriani
NJDEP
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment
CN-028
Trenton, New Jersey 08625

RE: Company Name Change From
Hüls America Inc. to CREANOVA Inc.
ISRA Case No. 85374

Dear Mr. Buriani

Please be advised that Hüls America Inc. has changed it's name to CREANOVA Inc. as of January 1, 1998. This is a simple name change which does not alter operation or ownership of the Elizabeth, New Jersey facility. Please contact me at 732-981-5453 if any additional submissions are necessary or if you have any questions.

Sincerely,

A. E. K.

Andrew E. Kruczek
Manager
Environmental Services

cc: B. Manganiello (ECM)
J. Wnek

CREANOVA Inc.
2 Turner Place
Piscataway, NJ 08855-0365
Tel.: (732) 560-6800

11

ECM

environmental compliance monitoring, Inc.

November 23, 1999

Mr. Michael Buriani
Case Manager
New Jersey Department of Environmental Protection
Bureau of Environmental Evaluation
Cleanup and Responsibility Assessment
401 East State Street, 5th Floor
CN 432
Trenton, New Jersey 08625-0432

RE: **RESULTS OF ADDITIONAL DELINEATION SAMPLING**
CREANOVA INC. (NUODEX INC.)
ELIZABETH, NEW JERSEY
ISRA CASE NO. 85374
ECM Project #1135

Dear Mr. Buriani:

This letter has been prepared by Environmental Compliance Monitoring, Inc. (ECM), on behalf of Degussa Hüls Corporation (DHC), formerly CREANOVA Inc., to present the results of additional delineation soil sampling activities conducted at the above-referenced site on October 7, 1999. The soil delineation sampling was proposed in ECM's submittal to the NJDEP entitled *Response to NJDEP 6/3/99 RAR Review* (dated September 14, 1999).

A limited soil sampling program was proposed to delineate specific compounds of concern reported at levels above the most stringent of the above New Jersey Department of Environmental Protection - Residential Direct Contact Soil Cleanup Criteria (NJDEP-RDCSCC) and identified by the NJDEP during their review of the RAR submittal. The proposed sampling locations were described in ECM's correspondence dated September 14, 1999, and are summarized below:

- The NJDEP requested delineation of the lead level to the north of the DS-04a location (425 parts per million [ppm). A delineation sample, designated DS-04b/0'-0.5', was collected to the north of the DS-04a sample location. Figure 1 (attached) presents the location of the DS-04b sample. The lead result was reported at 370 ppm, which is below the NJDEP-RDCSCC (400 ppm). Based on the reported results lead has been delineated to the north of the referenced locations.

349 Route 206, Hillsborough, New Jersey 08876
PHONE: 908-874-0990 FAX: 908-874-0920
ecm-inc@att.net
225 South Plank Road, Newburgh, New York 12550
PHONE: 914-568-0890 FAX: 914-568-0880

2 • An additional delineation soil sample, DS-17a, was collected to delineate lead levels to the west of the DS-17 location. Lead was previously detected at the DS-17/1'-1.5' and 3.5'-4' sample location at levels above NJDEP-RDCSCC (400 ppm) at levels of 767 ppm and 1,160 ppm, respectively. The DS-17a sample was proposed to be collected along the western property boundary, on the western exterior of the warehouse building, in a historically non-operational area of the site. Delineation soil samples were collected on October 7, 1999 from the 1'-1.5' and 3.5'-4' intervals and analyzed for lead. Figure 1 presents the location of the DS-17a sample. The DS-17/1'-1.5' and 3.5'-4' lead results were 82.5 ppm and 84.2 ppm, respectively, below the NJDEP-RDCSCC. The reported results indicated that lead has successfully been delineated to the west of sample location DS-17.

3 • The pesticide dieldrin was reported in sample points 5D5/1'-1.5' (0.099 ppm), 5D6/1'-1.5' (0.17 ppm), 5D8/1'-1.5' (0.56 ppm) and 5D10/1'-1.5' (0.18 ppm) above the NJDEP-RDCSCC of 0.042 ppm. Delineation of dieldrin was achieved to the east by sample points 5D7/1'-1.5' and 5D9/1'-1.5' which reported dieldrin as not detected. Vertical delineation was achieved by the 3'-3.5' interval of 5D5, 5D6, 5D8 and 5D10. Samples were collected on October 7, 1999, from the 1'-1.5' interval to the north, west, and south of the warehouse to delineate the dieldrin levels in these directions. The additional delineation sample locations were designated as 6D1 through 6D3. Figure 2 presents the 6D1 through 6D3 sample locations. The results of the delineation sampling indicated that dieldrin was not detected above the method detection limits (MDLs) of <0.0058 ppm to <0.0063 ppm, in each of the samples 6D1 through 6D3. Based on these results, dieldrin has been delineated to the NJDEP-RDCSCC of 0.042 ppm.

4 • Several warehouse sample points (5D5, 5D6, and 5D10) were reported with MDLs above the RDCSCC for aldrin. To assess the elevated MDLs, a sample designated 5D10a was collected from a previous sample point 5D10/1'-1.5' for aldrin analyses to rectify the elevated MDL issue. Figure 2 presents the 5D10a sample location. The results indicated that aldrin was not detected, above the MDL of <0.0063 ppm in sample 5D10a, below the NJDEP-RDCSCC of 0.040 ppm. As aldrin has not been previously detected and the MDL issue has been rectified, no further action is warranted relative to this compound.

The reported laboratory analytical results for the each of the six additional delineation samples are below the most stringent of the NJDEP-SCC for their respective target parameters. The results of the additional delineation soil sampling are summarized on the attached Table 1. A copy of the laboratory analytical report is also included as Attachment A. Based on the reported results of the delineation sampling detailed above, no further actions are warranted or required at these locations.

Your time and attention to this project is greatly appreciated. If any additional issues arise during review of this or other project related information, we respectfully request an initial call and/or meeting with the NJDEP in order to expeditiously resolve any outstanding issue(s).

Sincerely,

ENVIRONMENTAL COMPLIANCE MONITORING, INC.

Bruce Manganiello
Operations Manager

Attachments: Figure 1, Figure 2
Table 1 – Analytical Results Summary
Attachment A – Laboratory Analytical Data Report

cc: A. Kruzcek, CREANOVA
ECM File 1135-A2, L

TABLES

TABLE 1
ADDITIONAL DELINEATION SOIL SAMPLING ANALYTICAL SUMMARY – OCTOBER 1999
CREANOVA INC. – ELIZABETH, NEW JERSEY
PROJECT #1135

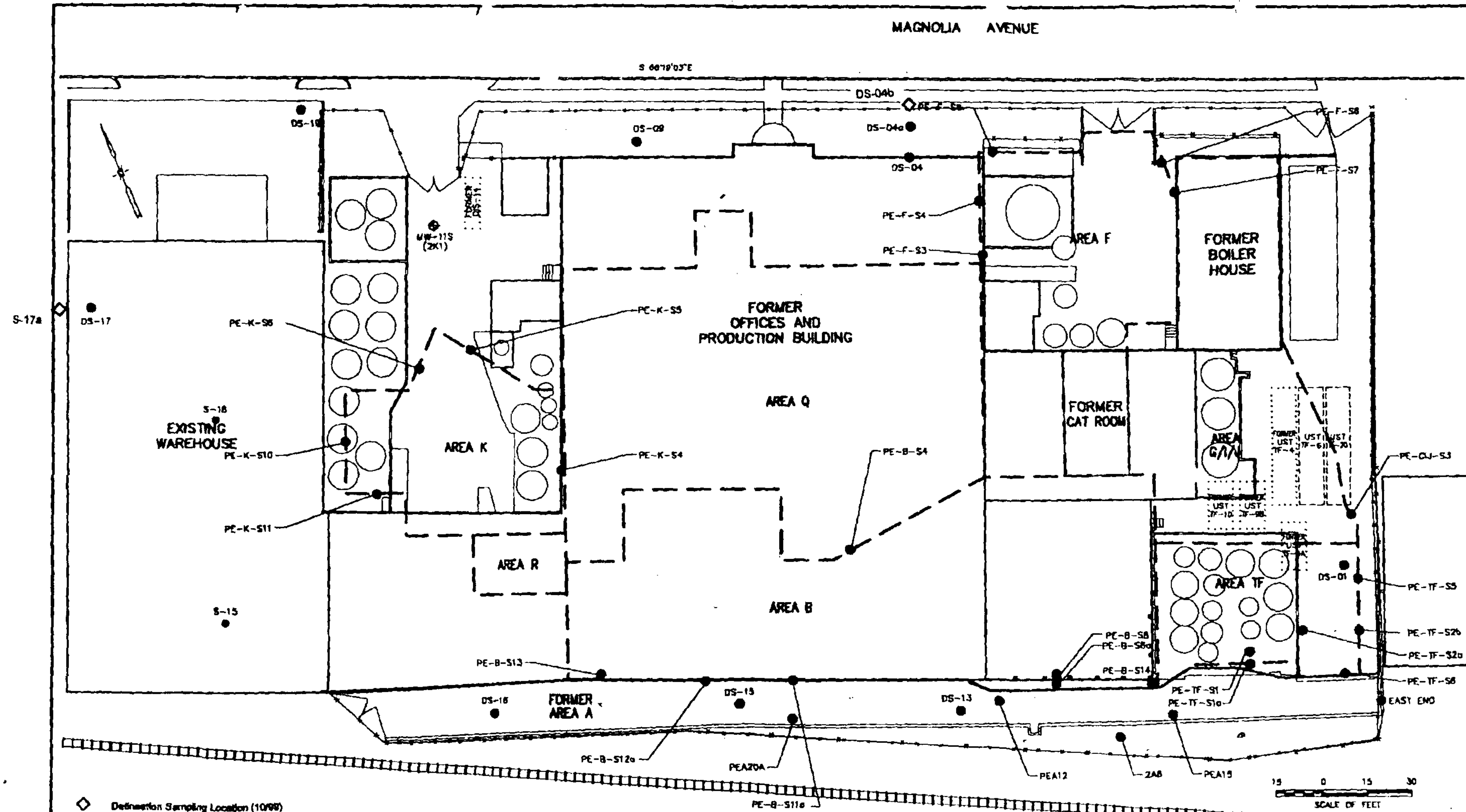
Sample Identification	DS-04b	DS-17a	DS-17a	SCC
Sample Depth (BGS)	0-0.5	1-1.5	3.5-4	
Laboratory Identification	G5217	G5215	G5216	
Sample Date	10/7/99	10/7/99	10/7/99	
METALS				
Lead	370	82.5	84.2	400

TABLE 1 (CONTINUED)
ADDITIONAL DELINEATION SOIL SAMPLING ANALYTICAL SUMMARY – OCTOBER 1999
CREANOVA INC. – ELIZABETH, NEW JERSEY
PROJECT #1135

Sample Identification	5D-10A	6D-1	6D-2	6D-3	SCC
Sample Depth (BGS)	1-1.5	1-1.5	1-1.5	1-1.5	
Laboratory Identification	G5223	G5219	G5220	G5222	
Sample Date	10/7/99	10/7/99	10/7/99	10/7/99	
PESTICIDES					
Aldrin	ND < 0.0063	NT	NT	NT	0.040
Dieldrin	NT	ND < 0.0063	ND < 0.0063	ND < 0.0058	0.042

Notes:
All results reported in milligrams per kilogram (mg/kg).
BGS : Below Ground Surface.
SCC : The most stringent of NJDEP Soil Cleanup Criteria for listed compounds.
NT : Not Tested.
ND : Not Detected.

FIGURES

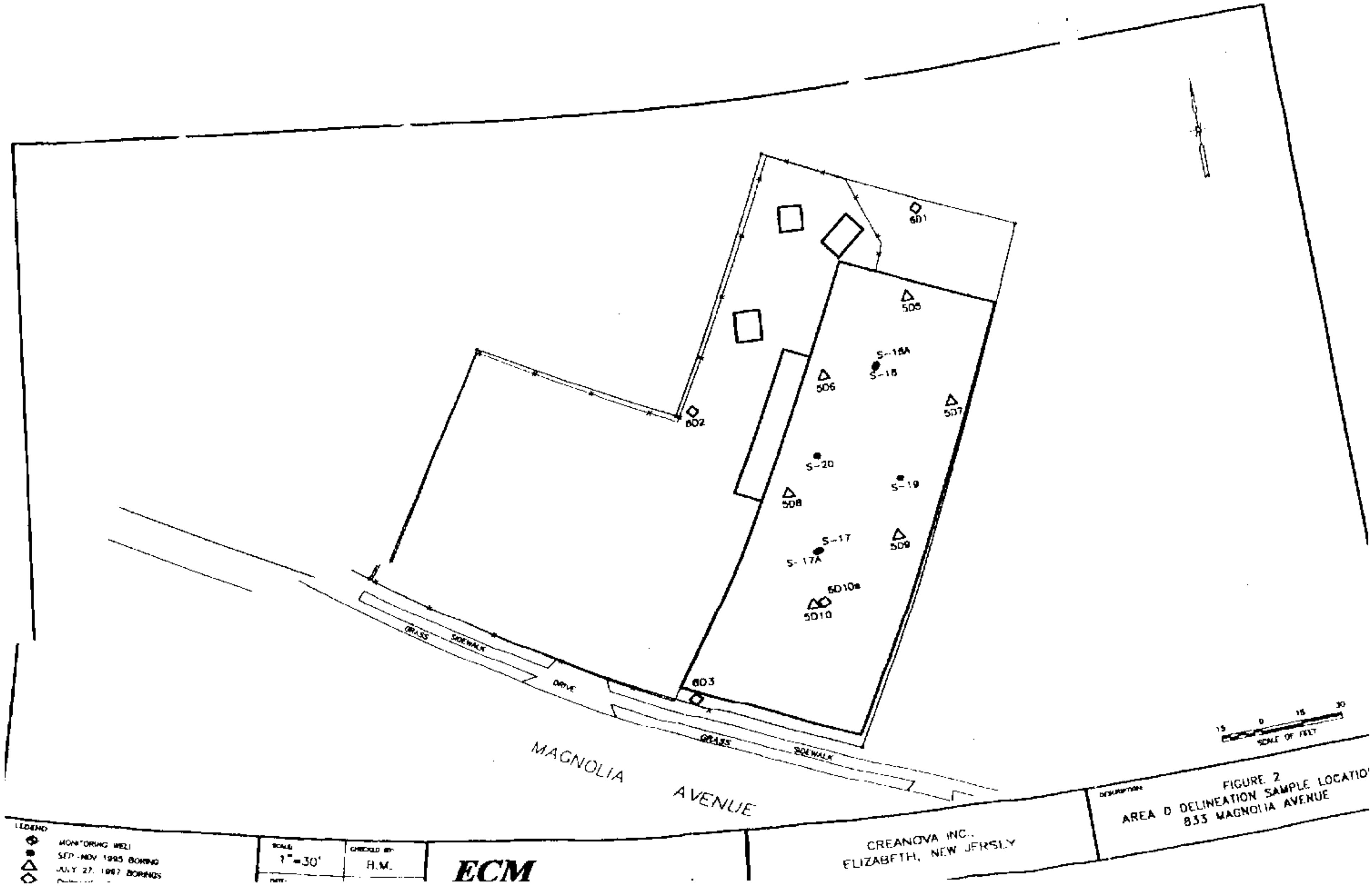


◇ Delineation Sampling Location (10/99)

LEGEND:
- UNIT OF REMEDIAL EXCAVATION AREAS
- USTs (REMAINING IN PLACE)
- USTs (REMOVED)
- SAMPLE POINTS

SCALE: 1"=30'	CHECKED BY: B.M.	ECM environmental compliance monitoring, inc.	CREANOVA INC., ELIZABETH, NEW JERSEY	DESCRIPTION: FIGURE 1 SELECT RAR SAMPLE LOCATIONS AND DELINEATION SAMPLE LOCATIONS
DATE: 8/2/99	DRAWING NO: F3RAR			

959270496



6D1
5D5
S-18A
S-18
5D6
5D7
6D2
S-20
S-19
5D8
S-17
S-17A
5D9
5D10a
5D10
6D3
GRASS
SIDEWALK
DRIVE
GRASS
SIDEWALK
MAGNOLIA AVENUE
SCALE OF FEET
LEGEND
MONITORING WELL
SEP.-NOV. 1995 BORING
JULY 27, 1997 BORINGS
SCALE
1"=30'
CHECKED BY
R.M.
ECM
CREANOVA INC.
ELIZABETH, NEW JERSEY
FIGURE 2
AREA D DELINEATION SAMPLE LOCATIO
833 MAGNOLIA AVENUE

959270497

ATTACHMENT A

LABORATORY ANALYTICAL DATA REPORT

21ST CENTURY ENVIRONMENTAL

618 HERON DRIVE, P.O. BOX 489 • BRIDGEPORT, NJ 08014-0489 • 609-467-9521

ECM

PROJECT: 1135

REPORT NO: G5215 - G5223

DATE REPORTED: OCTOBER 29,1999

ANALYSIS NO	CLIENT ID
G5215	DS-17A (1-1.1)
G5216	DS-17A (3.5-4)
G5217	DS-04B (0-0.5)
G5218	DS-04C (0-0.5)
G5219	6D 1 (1-1.5)
G5220	6D 2 (1-1.5)
G5221	6D 3 (0-0.5)
G5222	6D 3 (1-1.5)
G5223	5D 10A (1-1.5)

DATE RECEIVED: OCTOBER 8, 1999

TWENTY FIRST CENTURY ENVIRONMENTAL, INC.

Richard W. Lynch

RICHARD W. LYNCH
LABORATORY MANAGER

NARRATIVE

There were no problems encountered during the analysis of this group of samples (G5215 - G5223). All extractions and analysis were performed within proper hold times. Final results are reported on a dry weight basis unless otherwise stated.

G5215-G5223

CHAIN OF CUSTODY

21st Century Environmental
818 Heron Drive, P.O. Box 499 • Bridgeport, NJ 08014-0499
908.467.9512 • 908.467.9523 FAX

CUSTOMER: ECM
ADDRESS: 349 Route 206
TELEPHONE: (908) 874-0990
PROJECT: 1135
PROJECT MANAGER: BTM
PROJECT LOCATION: Elizabeth STATE: NJ
P.O. NUMBER:

TURNAROUND (INDICATE WORKING DAYS, CONFIRM WITH LAB): 1 2 7 14 21 OTHER:
DELIVERABLES (PLEASE CIRCLE): REDUCED / TIER I / TIER II / ECRA / CLP / RESULTS ONLY
OTHER:
FAX RESULTS TO: (908) 874-0920

ADDITIONAL INFORMATION / SPECIAL INSTRUCTIONS

- need EDD for these Samples
- MDL's for Dieldrin & Aldrin must meet NJDEP SCC of 0.040 ppm & 0.042 ppm, respectively

* hold this sample pending other analyses

SAMPLE NUMBER	SAMPLE DESCRIPTION	MATRIX	DATE	TIME	COMP	GRAB	NUMBER OF CONTAINERS	VOLATILE ORGANICS	SEMI VOA'S (BNA'S)	PESTICIDES/PCB'S	PCB'S	BTEX	TPH-PETROLEUM HYDROCARBONS	CORROSIVITY	IGNITABILITY	FLASHPOINT	REACTIVITY	TOC	TCLP METALS	TCLP VOLATILE ORGANICS	TCLP SEMI VOA'S (BNA'S)	TCLP PEST./HERB	PRIORITY POLLUTANT METALS (13)	HBL METALS (23)	CYANIDE	OIL AND GREASE	TOX	RCRA METALS (8)	Lead	Dieldrin	Aldrin
	DS-17a (1'-1.5')	Soil	10/7/99	1050		X	1																						X		
	DS-17a (3.5-4')	↓	↓	1100		X	1																						X		
	DS-04b (0-0.5)			1155		X	1																						X		
*	DS-04c (0-0.5)			1200		X	1																						X		
	GD1 (1-1.5')			1600		X	1																							X	
	GD2 (1-1.5')			1505		X	1																							X	
*	GD3 (0-0.5')			1135		X	1																						X		
	GD3 (1-1.5')			1145		X	1																							X	
	SD10a (1'-1.5')	↓	↓	1320		X	1																								X

Relinquished By: [signature] Date 10/8/99 Time 2:10p

WHITE LAB COPY
YELLOW CUSTOMER COPY

Received By: Jerry McHorter Date 10/8/99 Time 2:10p
Richard W Lynd 10/8/99 1650

959270501

METALS

Samples for metal analysis were run in accordance with the methods prescribed in SW-846. This includes a nitric acid digestion followed by either Furnace, Flame Atomic Absorption, Flameless Atomic Absorption, or Inductively Coupled Plasma analysis.

Aqueous/Soil samples for mercury analysis were run in accordance with SW-846 methods 7470/7471. These are cold-vapor atomic absorption methods.

Drinking waters were run in accordance with EPA 200 series methods.

PESTICIDES/PCB's

SW-846 Method 8081 - This method covers the determination of pesticides and PCB's in samples by extraction/concentration with organic solvents and subsequent qualification/quantification by Gas Chromatography. The gas chromatograph utilized an electron capture detector (ECD) which is applicable for the determination of the compounds listed for the method in the SW-846 manual "Test Methods for Evaluating Solid Waste".

CERTIFICATE OF ANALYSIS

LEAD

ANALYSIS NO	CLIENT ID	MDL (mg/Kg)	RESULT (mg/Kg)	DATE
G5215	DS-17A (1-1.5)	9.00	82.5	10/14/99
G5216	DS-17A (3.5-4)	9.00	84.2	10/14/99
G5217	DS-04B (0-0.5)	9.00	370	10/14/99

PESTICIDE DATA ANALYSIS SHEET
1B
Signal 1

SAMPLE NO.
6D1-(1-1.5)

Lab Name: 21ST CENTURY ENVIRON   Contract:

Project No.:   Site: Location: Group:

Matrix: (soil/water) SOIL   Lab Sample ID: G5219

Sample wt/vol: 10 (g/mL) g   Lab File ID: D7704.D

Level: (low/med) LOW   Date Received: 10/8/99

% Moisture: 20   decanted: (Y/N): N   Date Extracted: 10/11/99

Concentrated Extract Volume: 10 (ml)   Date Analyzed: 10/12/99

Injection Volume: 2.0 (uL)   Dilution Factor: 1

GPC Cleanup: (Y/N) N   pH:

CAS No.	Compound	MDL	Result ug/Kg	Q
	Dieldrin	6.3		U

J = Detected below method detection limit   U = Not Detected

PESTICIDE DATA ANALYSIS SHEET
1B

Signal 1

SAMPLE NO.

6D2-(1-1.5)

Lab Name: 21ST CENTURY ENVIRON   Contract: ______

Project No.: ______   Site: ______   Location: ______   Group: ______

Matrix: (soil/water) SOIL   Lab Sample ID: G5220

Sample wt/vol: 10 (g/mL) g   Lab File ID: D7705.D

Level: (low/med) LOW   Date Received: 10/8/99

% Moisture: 21   decanted: (Y/N): N   Date Extracted: 10/11/99

Concentrated Extract Volume: 10 (ml)   Date Analyzed: 10/12/99

Injection Volume: 2.0 (uL)   Dilution Factor: 1

GPC Cleanup: (Y/N) N   pH: ______

CAS No.	Compound	MDL	Result ug/Kg	Q
	Dieldrin	6.3		U

J = Detected below method detection limit   U = Not Detected

PESTICIDE DATA ANALYSIS SHEET
1B
Signal 1

SAMPLE NO.
6D3-(1-1.5)

Lab Name: 21ST CENTURY ENVIRON   Contract: ____

Project No.: ____   Site: ____   Location: ____   Group: ____

Matrix: (soil/water) SOIL   Lab Sample ID: G5222

Sample wt/vol: 10 (g/mL) g   Lab File ID: D7706.D

Level: (low/med) LOW   Date Received: 10/8/99

% Moisture: 14   decanted: (Y/N): N   Date Extracted: 10/11/99

Concentrated Extract Volume: 10 (ml)   Date Analyzed: 10/12/99

Injection Volume: 2.0 (uL)   Dilution Factor: 1

GPC Cleanup: (Y/N) N   pH: ____

CAS No.	Compound	MDL	Result ug/Kg	Q
	Dieldrin	5.8		U

J = Detected below method detection limit   U = Not Detected

PESTICIDE DATA ANALYSIS SHEET
1B
Signal 1

SAMPLE NO.
5D10A-(1-1.5)

Lab Name: 21ST CENTURY ENVIRON Contract: ______

Project No.: ______ Site: ______ Location: ______ Group: ______

Matrix: (soil/water) SOIL Lab Sample ID: G5223

Sample wt/vol: 10 (g/mL) g Lab File ID: D7707.D

Level: (low/med) LOW Date Received: 10/8/99

% Moisture: 21 decanted: (Y/N): N Date Extracted: 10/11/99

Concentrated Extract Volume: 10 (ml) Date Analyzed: 10/12/99

Injection Volume: 2.0 (uL) Dilution Factor: 1

GPC Cleanup: (Y/N) N pH: ______

CAS No.	Compound	MDL	Result ug/Kg	Q
	Aldrin	6.3		U

J = Detected below method detection limit U = Not Detected

00010

959270507

DATA PACKAGE

CERTIFICATE OF ANALYSIS

LEAD

ANALYSIS NO	CLIENT ID	MDL (mg/Kg)	RESULT (mg/Kg)	DATE
G5215	DS-17A (1-1.5)	9.00	82.5	10/14/99
G5216	DS-17A (3.5-4)	9.00	84.2	10/14/99
G5217	DS-04B (0-0.5)	9.00	370	10/14/99

PESTICIDE DATA ANALYSIS SHEET
1B
Signal 1

SAMPLE NO.

6D1-(1-1.5)

Lab Name: 21ST CENTURY ENVIRON Contract:

Project No.: Site: Location: Group:

Matrix: (soil/water) SOIL Lab Sample ID: G5219

Sample wt/vol: 10 (g/mL) g Lab File ID: D7704.D

Level: (low/med) LOW Date Received: 10/8/99

% Moisture: 20 decanted: (Y/N): N Date Extracted: 10/11/99

Concentrated Extract Volume: 10 (ml) Date Analyzed: 10/12/99

Injection Volume: 2.0 (uL) Dilution Factor: 1

GPC Cleanup: (Y/N) N pH:

CAS No.	Compound	MDL	Result ug/Kg	Q
	Dieldrin	6.3		U

J = Detected below method detection limit U = Not Detected

12

NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

The New Jersey Department of Environmental Protection hereby grants you a NJPDES permit for the facility/activity named in this document. This permit is the regulatory mechanism used by the department to ensure your discharge will not harm the environment. By complying with the terms and conditions specified, you are assuming an important role in protecting New Jersey's valuable water resources. Your acceptance of this permit is an agreement to conform with all of its provisions when constructing, installing, modifying, or operating any facility for the collection, treatment, or discharge of pollutants to waters of the state. If you have any questions about this document, please feel free to contact the department representative listed in the permit cover letter. Your cooperation in helping us protect and safeguard our state's environment is anticipated and appreciated.

PERMIT NUMBER NJ0102270

Permittee	Co-Permittee
CREANOVA INC PO BOX 365 PISCATAWAY NJ 08855	

Property Owner	Location of Activity
CREANOVA INC PO BOX 365 PISCATAWAY NJ 08855	CREANOVA INC 830 MAGNOLIA AVE ELIZABETH NJ 08872

Current Authorization Covered By This Approval And Previous Authorization	Issuance Date	Effective Date	Expiration Date
B :IND/COMMERCIAL/THERMAL DSW	03/17/2000	05/01/2000	04/30/2005

DSN#: 001A
CLASSIFICATION: FW2-NT
LATITUDE: 40°39'54.2"
LONGITUDE: 74°11'53.9"
RECEIVING STREAM: Perimeter ditch that circumscribes Newark Airport

By Authority of:
COMMISSIONER'S OFFICE

Debra Hammond

DEP AUTHORIZATION
DEBRA HAMMOND, BUREAU CHIEF
DIVISION OF WATER QUALITY, BPSP REGI

(Terms, conditions and provisions attached hereto)

ADJUDICATORY HEARING REQUEST CHECKLIST AND TRACKING FORM FOR INDIVIDUAL NJPDES PERMITS*

I. Permit Being Appealed:

____

Facility Name

____________________ ____________________

Issuance Date of Final Permit Decision | Permit Number

II. Person Requesting Hearing:

____________________ ____________________

Name/Organization | Name of Attorney (if applicable)

____________________ ____________________

____________________ ____________________

____________________ ____________________

Address | Address of Attorney

____________________ ____________________

Telephone Number | Telephone Number of Attorney

III. Status of Person Requesting Hearing (Check One):

_____ Permittee under the permit number identified above.
Complete A. and C. through I. of Section IV. below.

_____ Person seeking consideration as a party to the action.
Complete B. through I. of Section IV. below.

IV. Include the following information as part of your request:

A. If you are a <u>permittee under the permit number identified above</u>:

1. For the Office of Legal Affairs only, a copy of the permit clearly indicating the permit number and issuance date;
2. A list of the specific contested permit condition(s) and the legal or factual question(s) at issue for each condition, including the basis of any objection;
3. The relevance of the legal and/or factual issues to the permit decision;
4. Suggested revised or alternative permit conditions and how they meet the requirements of the State or Federal Act; and
5. Information supporting the request or other written documents relied upon to support the request, unless this information is already in the administrative record (in which case, such information shall be specifically referenced in the request).

B. If you are a <u>person seeking consideration as a party to the action</u>:

1. A statement setting forth each legal or factual question alleged to be at issue;

*For NJPDES permits, the procedures for requesting an adjudicatory hearing on a final permit decision and for the Department's evaluation and processing of such requests are set forth in N.J.A.C. 7:14A-17.

2. A statement setting forth the relevance of the legal or factual issue to the permit decision, together with a designation of the specific factual areas to be adjudicated;
3. A clear and concise factual statement of the nature and scope of your interest which meets the criteria set forth at N.J.A.C. 7:14A-17.3(c)4;
4. A statement that, upon motion by any party granted by the administrative law judge, or upon order of the administrative law judge's initiative, you shall make yourself, all persons you represent, and all of your officers, directors, employees, consultants, and agents available to appear and testify at the administrative hearing, if granted;
5. Specific references to the contested permit conditions, as well as suggested revised or alternative permit conditions, including permit denials, which, in your judgment, would be required to implement the purposes of the State Act;
6. Identification of the basis for any objection to the application of control or treatment technologies, if identified in the basis or fact sheets, and the alternative technologies or combination of technologies which, in your judgment, are necessary to satisfy the requirements of the State Act;

C. The date you received notification of the final permit decision;
D. The names and addresses of all persons whom you represent;
E. A statement as to whether you raised each legal and factual issue during the public comment period in accordance with N.J.A.C. 7:14A-15.13 (and in accordance with repealed N.J.A.C. 7:14A-8.4, if the public comment period began or ended before May 5, 1997);
F. An estimate of the amount of time required for the hearing;
G. A request, if necessary, for a barrier-free hearing location for disabled persons;
H. A clear indication of any willingness to negotiate a settlement with the Department prior to the Department's processing of your hearing request to the Office of Administrative Law; and
I. This form, completed, signed and dated with all of the information listed above, including attachments, to:
    1. Office of Legal Affairs
       ATTENTION: Adjudicatory Hearing Requests
       Department of Environmental Protection
       401 East State Street
       PO Box 402, Trenton, New Jersey 08625-0402
    2. Debra Hammond, Chief,
       Bureau of Point Source Permitting Region 2
       Department of Environmental Protection
       401 East State Street
       PO Box 029, Trenton, New Jersey 08625-0029
    3. Any other person named on the permit (if you are a permittee under that permit).
    4. The permittee(s) (if you are a person seeking consideration as a party to the action).

V. Signature: ______________________________ Date: ____________

Working Cost Center 4FDC: Ramanathan Asokan, Bureau of Point Source Permitting Region 2

STAY REQUEST FORM

I. Permit Containing Condition(s) to Be Stayed:

____

Facility Name

______________________ ______________________

Issuance Date of Final Permit Decision | Permit Number

II. Person Requesting the Stay(s):

______________________ ______________________

Name/Organization | Name of Attorney (if applicable)

______________________ ______________________

______________________ ______________________

______________________ ______________________

Address | Address of Attorney

______________________ ______________________

Telephone Number | Telephone Number of Attorney

N.J.A.C. 7:14A-17.6 provides for stays of contested permit conditions. In order for the Department to consider a request for stay, the person making the request must submit a written request to the Department by certified mail or other means which provides verification of the date of delivery. In the request for a stay of each permit condition, a written evaluation must be submitted which addresses each of the factors at N.J.A.C. 7:14A-17.6(c). Briefly stated, these factors include: 1) the permittee's ability to comply with the permit condition using existing treatment facilities, 2) the permittee's ability to comply with the permit condition by implementing low cost short-term modifications to the existing treatment facility, 3) the level of pollutant control actually achieved using short term modifications, 4) the cost to comply with the condition and 5) the environmental impacts granting a stay will have on the receiving waterbody.

This completed stay request form, along with the evaluations mentioned above, shall be submitted to both Debra Hammond, Chief, Bureau of Point Source Permitting Region 2, Division of Water Quality, Department of Environmental Protection, PO Box 029, Trenton, New Jersey, 08625-0029 and the Office of Legal Affairs, Department of Environmental Protection, PO Box 402, Trenton, New Jersey 08625-0402. A person seeking consideration as party to the action who has requested an adjudicatory hearing in accordance with N.J.A.C. 7:14A-17.2 may also request a stay provided notice of the request is also provided to the permittee(s).

Signature: ______________________ Date: __________

*For NJPDES permits, the procedures for requesting a stay of a final permit condition and for the Department's evaluation and processing of such requests are set forth in N.J.A.C. 7:14A-17.

New Jersey Department of Environmental Protection
Division of Water Quality
Bureau of Point Source Permitting Region 2

RESPONSE TO COMMENTS

Comments were received on the draft NJPDES Permit No. NJ0102270 issued on February 02, 2000. The following person commented during the public comment period which ended on March 10, 2000:

1.. Andrew E. Kruczek, Manager, Creanova Inc., in a letter dated February 28, 2000.

A summary of the timely and significant comments received, the New Jersey Department of Environmental Protection's (Department) responses to these comments, and an explanation of any changes from the draft action have been included below:

1. COMMENT:

The commenter requests that the monitoring frequency for the seven PCB parameters be reduced from quarterly to semi-annually. Creanova Inc. believes any residual PCB contamination remaining in soils beneath the site water table will be captured by the ground water recovery system, treated and not discharged to surface water. In addition, if at any time in the future PCBs are present in the discharge at a level above the appropriate surface water criteria, Creanova understands the Department may reopen and modify the permit as necessary to incorporate an increased monitoring frequency or effluent limitations.

RESPONSE:
The requested monitoring reduction from quarterly to semi-annually for PCBs is not granted currently. However, the Department has added a note to the effluent limitations table in the final permit indicating that a frequency reduction may be granted if the following conditions are met:

The permittee shall monitor for PCBs quarterly for EDP + one year using an approved methodology and RQL. If these four sample results indicate nondetectable levels, upon written request from the permittee and written approval from the Department, the quarterly, monitoring frequency may be reduced to semi-annually.

2. COMMENT:
Add the following information to Section III of the Fact Sheet, Page 2 of 15 pages:

The following parameters have been added and will be monitored semi-annually:

- PCB-1242
- PCB-1254
- PCB-1221
- PCB-1232
- PCB-1248
- PCB-1260
- PCB-1016

RESPONSE:
Since the fact sheet is not part of the final permit this document will serve to amend the administrative record.

Degussa-Hüls Corporation
2 Turner Place. Piscataway, NJ 08855-0365
732-560-6800

Degussa-Hüls Corporation

February 28, 2000

Ms. Debra Hammond, Chief
Bureau of Point Source Permitting
Region 2
P. O. Box 029
Trenton, New Jersey 08625

RE: Draft NJPDES Renewal Permit
Creanova Inc.
NJPDES Permit No. NJ00102270
Elizabeth Township, Union County

Dear Ms. Hammond:

Creanova Inc. has reviewed the above referenced draft NJPDES Permit and offers the following comments:

1. Request the monitoring frequency for the seven PCB parameters be reduced from quarterly to semi-annually. Creanova Inc. believes any residual PCB contamination remaining in soils beneath the site water table will be captured by the ground water recovery system, treated and not discharged to surface water. In addition, if at any time in the future PCBs are present in the discharge at a level above the appropriate surface water criteria, Creanova understands the Department may reopen and modify the permit as necessary to incorporate an increased monitoring frequency or effluent limitations..

2. Add the following information to Section III of the Fact Sheet, Page 2 of 15 pages:

   The following parameters have been added and will be monitored semi-annually:
   - PCB-1242
   - PCB-1254
   - PCB-1221
   - PCB-1232
   - PCB-1248
   - PCB-1260
   - PCB-1016

If you have any questions or require additional information, please contact me at 732-981-5453.

Sincerely,

Andrew E. Kruczek
Manager
Environmental Services

cc: B. Manganiello (ECM)
G. Sheppard

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DIVISION ...
BUREAU ...

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Checklist of Parts and Modules Comprising this NJPDES Permit

1. Cover Letter

2. Public Notice (Draft Only)

3. Fact Sheet with Statement of Basis (Draft Only)

4. NJPDES Permit Authorization Page

5. Checklist

6. Part I - DSW - General Conditions for Individual NJPDES Permits

7. Part II - Additional General Conditions for All NJPDES Discharge to Surface Water Permits:

8. Part III - Limitations and Monitoring Requirements

    ___ Part III - A
    ✓ Part III - B/C
    ___ Part III - L
    ___ Part III - DGW Specify type(s):________

9. Part IV - Additional Requirements and Special Conditions

    ___ Part IV - A
    ✓ Part IV - B/C
    ___ Part IV - L
    ___ Part IV - DGW Specify type(s):________
    ___ Part IV - RF (Stormwater)

10. ✓ Part V - Chronic Toxicity Methods

11. ___ Attachment 1 - Contents of SPPP

GENERAL CONDITIONS FOR INDIVIDUAL NJPDES PERMITS

The permittee shall comply with all conditions set forth in this permit and with all the applicable requirements incorporated into this permit by reference. The permittee is required to comply with the regulations which are in effect as of the effective date of the final permit.

Section A. GENERAL CONDITIONS

1.	Penalties for Violations	N.J.A.C. 7:14-8.1 et seq.
2.	Incorporation by Reference	N.J.A.C. 7:14A-2.3
3.	Toxic Pollutants	N.J.A.C. 7:14A-6.2(a)4i
4.	Duty to Comply	N.J.A.C. 7:14A-6.2(a)1 & (a)4
5.	Duty to Mitigate	N.J.A.C. 7:14A-6.2(a)5 & 11
6.	Inspection and Entry	N.J.A.C. 7:14A-2.11(e)
7	Enforcement Action	N.J.A.C. 7:14A-2.9
8.	Duty to Reapply	N.J.A.C. 7:14A-4.2(e)3
9.	Signatory Requirements for Applications and Reports	N.J.A.C. 7:14A-4.9
10.	Effect of Permit/Other Laws	N.J.A.C. 7:14A-6.2(a)6 & 7 & 2.9(c)
11.	Severability	N.J.A.C. 7:14A-2.2
12.	Administrative Continuation of Permits	N.J.A.C. 7:14A-2.8
13.	Permit Actions	N.J.A.C. 7:14A-2.7(c)
14.	Standard Reopener Clause	N.J.A.C. 7:14A-6.2(a)10
15.	Permit Duration and Renewal	N.J.A.C. 7:14A-2.7(a) & (b)
16.	Consolidation of Permit Process	N.J.A.C. 7:14A-15.5
17.	Confidentiality	N.J.A.C. 7:14A-18.2 & 2.11(g)
18.	Fee Schedule	N.J.A.C. 7:14A-3.1
19.	Treatment Works Approval	N.J.A.C. 7:14A-22 & 23

Section B. OPERATION AND MAINTENANCE

1.	Need to Halt or Reduce not a Defense	N.J.A.C. 7:14A-2.9(b)
2.	Proper Operation and Maintenance	N.J.A.C. 7:14A-6.12

Section C. MONITORING AND RECORDS

1.	Monitoring	N.J.A.C. 7:14A-6.5
2.	Recordkeeping	N.J.A.C. 7:14A-6.6
3.	Signatory Requirements for Monitoring Reports	N.J.A.C. 7:14A-6.9

Section D. REPORTING REQUIREMENTS

1.	Planned Changes	N.J.A.C. 7:14A-6.7
2.	Reporting of Monitoring Results	N.J.A.C. 7:14A-6.8
3.	Noncompliance Reporting	N.J.A.C. 7:14A-6.10 & 6.8(h)
	a. Hotline/Two Hour & Twenty-four Hour Reporting	N.J.A.C. 7:14A-6.10(c) & (d)
	b. Written Reporting	N.J.A.C. 7:14A-6.10(e) &(f) & 6.8(h)
4.	Duty to Provide Information	N.J.A.C. 7:14A-2.11, 6.2(a)14 & 18.1
5.	Schedules of Compliance	N.J.A.C. 7:14A-6.4
6.	Transfer	N.J.A.C. 7:14A-6.2(a)8 & 16.2

Section E. ADDITIONAL CONDITIONS

Operator Certification

Pursuant to N.J.A.C. 7:10A-1.1 et seq., every wastewater "system" not exempt pursuant to N.J.A.C. 7:10A-1.10(b) requires a licensed operator. The operator of a "system" shall meet the requirements of the Department pursuant to the provisions of N.J.A.C. 7:10A-1.1 et seq. and any amendments thereto. The name of the proposed operator, where one is required, shall be submitted to the Department in order that his/her qualifications may be determined prior to initiating operation of the treatment works. Further information regarding this requirement may be obtained from:

NJDEP
Bureau of Revenue
Examinations and Licensing Unit
PO Box 417
Trenton, New Jersey 08625-0417
(609) 777-1012

Operation Restrictions

The operation of a waste treatment or disposal facility shall at no time create: (a) a discharge, except as authorized by the Department in the manner and at the location(s) specified in the Part(s) III of this permit; or (b) any discharge to the waters of the State or any standing or ponded condition for water or waste, except as specifically authorized by a valid NJPDES permit.

Sampling Points

All samples shall be taken at the monitoring points specified in this permit and all effluent samples, unless otherwise specified, shall be taken before the effluent joins or is diluted by any other wastestream, body of water or substance. Monitoring points shall not be changed without notification to and the approval of the Department.

Monitoring and Reporting

The permittee shall report monitoring results on the Discharge Monitoring Report (DMR) forms or other monitoring report forms required by the permit or the Department at the intervals specified in the permit. Monitoring results shall be summarized and reported on the appropriate form following the completed reporting period. If a discharge does not occur during a particular reporting period, the permittee should write "NODI" across the face of the form. Unless otherwise specified or directed, signed copies of these forms shall be submitted postmarked no later than the 25th day of the calendar month following the completed reporting period to the following address:

NJDEP
Bureau of Permit Management
PO Box 029
Trenton, New Jersey 08625-0029
Attn.: Monitoring Reports

Intermittent Discharges (if Applicable)

The permittee is required to provide representative sampling of any regulated intermittent activity pursuant to N.J.A.C. 7:14A-6.5(a). Therefore, although a discharge may occur on an intermittent basis, it does not exempt the permittee from complying with the conditions of the permit. For example, if a permittee has a monthly monitoring and reporting requirement and the discharge occurs three separate times during the month, the permittee should obtain a sample during at least one of the discharge events occurring during the monitoring period. The permittee should report "NODI" on the DMR (or other required form) only if there are no discharge events during the entire reporting period.

Flow Measurements

When flow monitoring is required, appropriate flow measurement devices and methods consistent with accepted engineering/scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. Unless specified otherwise in this permit, devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than +/-10% from the true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration and operation of acceptable flow measurement devices can be obtained from the following references:

A. "A Guide to Methods and Standards for the Measurement of Water Flow", U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 421, May 1975, 97 pp. (Available from the U.S. Government Printing Office, Washington, D.C. 20402. Order by SD Catalog No. C13.10:421).

B. "Water Measurement Manual", U.S. Department of Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1974, 327 pp. (Available from the U.S. Government Printing Office, Washington, D.C. 20402. Order by Catalog No. 127.19/2:W29/2, Stock No. S/N 24003-0027.)

C. "Flow Measurement in Open Channels and Closed Conduits", U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 484, October 1977, 982 pp. (Available in paper copy or microfiche from National Technical Information Service (NTIS), Springfield, VA 22151. Order by NTIS No. PB-273 535/5ST.)

D. "NPDES Compliance Sampling Manual", U.S. Environmental Protection Agency, Office of Water Enforcement, Publication MCD-51, 1977, 140 pp. (Available from the General Services Administration (8FFS), Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver CO 80225.)

Applicability of Numerical Limitations

If only one analysis for a given parameter is made during any sampling period specified in this permit, the result of such analysis shall be construed as the average value of the parameter, as well as the maximum, for said sampling period. The permittee may take samples and have analysis made by a New Jersey Certified laboratory on additional occasions to those specified in this permit. If so, the average and the maximum values of all analytical results taken during the sampling period shall be reported as the applicable average and maximum values. However, for pH, minimum and maximum values are reported rather than average values.

ADDITIONAL GENERAL CONDITIONS FOR ALL NJPDES DISCHARGE TO SURFACE WATER PERMITS.

1. Permit Conditions Relating to Residuals Management

All preparers of residual shall comply with the following requirements regarding their generation, storage and ultimate management method(s):

A. All permittees shall give written notice to the Department of any planned physical alterations or additions to the permitted facility when the alteration or addition is expected to result in a significant change in the permittee's residual use or disposal practices. This includes, but is not limited to, notification to the Department of additional or different residual use or disposal sites not reported during the permit application process [40 CFR 122.41(l)(1)(iii) and N.J.A.C. 7:14A-6.7].

B. Where applicable, the permittee shall comply with land-based sludge management criteria and shall conform with the requirements for the management of residuals and grit and screenings under [N.J.A.C. 7:14A-6.15(a)]:

1. Section 405 of the Federal Act governing the disposal of sludge from treatment works treating domestic sewage;
2. The Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Solid Waste Management Rules, N.J.A.C. 7:26;
3. The Sludge Quality Assurance Regulations, N.J.A.C. 7:14C;
4. The Statewide Sludge Management Plan promulgated pursuant to the Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq., and the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq.; and
5. The provisions concerning disposal of sewage sludge and septage in sanitary landfills set forth at N.J.S.A. 13:1E-42 and the Statewide Sludge Management Plan. Any person who prepares residual that is disposed in a municipal solid waste landfill unit shall ensure that the residual meets the requirements in 40 CFR Part 258 and/or N.J.A.C. 7:26 concerning the quality of residual disposed in a municipal solid waste landfill unit. (That is, passes the Toxicity Characteristic Leaching Procedure and does not contain "free liquids" as defined at N.J.A.C. 7:14A-1.2.)

C. If any applicable standard for residual use or disposal is promulgated under section 405(d)of the Federal Act and Sections 4 and 6 of the State Act and that standard is more stringent than any limitation on the pollutant or practice in the permit, the Department may modify or revoke and reissue the permit to conform to the standard for residual use or disposal [40 CFR 122.44(b)(2) and N.J.A.C. 7:14A-6.3, 20.5 and 6.15(c)].

D. The permittee shall make provisions for storage, or some other approved alternative management strategy, for anticipated downtimes at a primary residual management alternative. The permittee shall not be permitted to store residual beyond the capacity of the structural treatment and storage components of the treatment works. N.J.A.C. 7:14A-20.8(a) and N.J.A.C. 7:26 provide for the temporary storage of residuals for periods not exceeding six months, provided such storage does not cause pollutants to enter surface or ground waters of the State. The storage of residual for more than six months is not authorized under this permit. However, this prohibition does not apply to residual that remains on the land for longer than six months when the person who prepares the residual demonstrates that the land on which the residual remains is not a surface disposal site or landfill. The demonstration shall explain why residual must remain on the land for longer than six months prior to final use or disposal, discuss the approximate time period during which the residual shall be used or disposed and provide documentation of ultimate residual management arrangements. Said demonstration shall be in writing, be kept on file by the person who prepares residual, and submitted to the Department upon request.

E. The permittee shall comply with the appropriate adopted District Solid Waste or Sludge Management Plan (which by definition in N.J.A.C. 7:14A-1.2 includes Generator Sludge Management Plans), unless otherwise specifically exempted by the Department. For domestic treatment works with a permitted flow equal to or greater than 1.0 MGD, pursuant to the Statewide Sludge Management Plan, should the permittee expand and/or upgrade wastewater treatment facilities, and in absence of a District Sludge Management Plan, the permittee shall develop a plan for management of residuals projected to be produced by the upgraded and/or expanded facilities at design (maximum permitted) flow or projected flow in ten (10) years, whichever is greater. The plan for the upgraded and/or expanded treatment facilities shall be submitted in conformance with the requirements of N.J.S.A. 13:1E-45 to the Bureau of Pretreatment and Residuals at the address cited below prior to implementation of the expanded or upgraded facilities:

Division of Water Quality
Bureau of Pretreatment and Residuals
PO Box 29
Trenton, New Jersey 08625

All plans approved by the Department are required to undergo a biennial review by the generator. If a modification is found to be necessary, an update must be submitted. Where it is determined during biennial review that no changes are necessary, the generator must submit a resolution stating that the plan has been reviewed and has been determined to require no amendments.

F. When a person who prepares bulk residual provides the bulk residual to a person who applies the bulk residual to the land, the person who prepares the bulk residual shall provide the Department and the person who applies the bulk residual notice and necessary information to comply with the requirements of N.J.A.C. 7:14A-20. This shall include, but not be limited to, the applicable recordkeeping requirements and certification statements of 40 CFR 503.17 as referenced at N.J.A.C 7:14A-20.7(j). [N.J.A.C. 7:14A-20.7(b)1vi.]

G. When a person who prepares residual provides residual to another person who prepares the residual, the person who provides the residual shall provide the Department and the person who receives the residual notice and necessary information to comply with N.J.A.C. 7:14A-20. [N.J.A.C. 7:14A-20.7(b)1vii.]

H. Any person who prepares bulk residual in New Jersey that is applied to land in a State other than New Jersey shall comply with the requirement at N.J.A.C. 7:14A-20.7(b)1.ix and/or 20.7(b)1.x, as applicable, to provide written notice to the Department and to the permitting authority for the State in which the bulk residual is proposed to be applied.

2. <u>Monitoring and Reporting</u>

In addition to the monitoring and reporting requirements in Part I, a duplicate signed copy of all other monitoring reports required from the permittee including the DMRs shall be submitted to the DRBC (**only for dischargers to the Delaware River Basin**), and the ISC (**only for dischargers to the Interstate Sanitation Commission district**) at the following addresses:

Delaware River Basin Commission	Interstate Sanitation Commission
P.O. Box 7360	311 West 43rd Street
West Trenton, New Jersey 08628	New York, New York 10036
Attn: Executive Director	Attn: Director/Chief Engineer

3. <u>Schedule of Maintenance</u>

Any maintenance of facilities, which might necessitate unavoidable interruption of operation and degradation of effluent quality, shall be scheduled during non-critical water quality periods and carried out in a manner approved by the Department.

4. <u>Emergency Plans</u>

Consistent with N.J.A.C. 7:14A-6.12, an emergency plan shall be included as part of the Operation and Maintenance Manual.

5. <u>Stormwater Only Discharges</u> (Not applicable to Sanitary Surface Water Discharges/Category A)

Stormwater shall be sampled during the first precipitation event of the monitoring period which causes a discharge at the site during working hours, unless otherwise directed in the permit. Stormwater monitoring should not necessarily be conducted at 30-day intervals. Therefore, it is incorrect for the permittee to choose a sampling date which remains the same every month, and report "NODI" on the DMR if it does not rain on that particular day.

6. <u>Upset and Bypasses/Non-compliance</u>

All permittees shall report to the Department (and receiving DTW, if applicable) any permit non-compliance in accordance with the requirements of N.J.A.C. 7:14A-6.10.

1. FACILITY INFORMATION

A. Discharge Point

DSN	Latitude	Longitude	Receiving Stream	Stream Classification
002A	40° 39' 54.2"	74° 11'53.9"	Perimeter Ditch that Circumscribes Newark Airport via a storm sewer	FW2-NT

B. Description of Facility (For informational purposes only; modification of this section is not necessary for changes occurring during the permit term)

This existing facility discharges an average of 15,000 gallons per day of treated groundwater to the perimeter ditch that circumscribes Newark Airport, via a storm sewer, through outfall DSN 002A. The groundwater has been contaminated with volatile organic compounds from previous operations at the site.

DSN	Monthly Average Flow	Long Term Average Flow (DMR)	Description of Treatment (if any)	Licensed Operator Classification
001A	15,000 GPD	13,000 GPD	automatic purge filter (for removal of suspended solids), flow equalization tank, bag filter, three high pressure liquid carbon filters in series, and an above ground storage tank.	N2

C. Major/Minor Rating

The facility has been classified as a **minor** discharger by the New Jersey Department of Environmental Protection in accordance with the U.S. EPA rating criteria.

?LUENT LIMITATIONS AND MONITORING REQUIREMENTS

period beginning EDP and lasting through EDP + 5 years, the permittee is authorized to :eated groundwater from Discharge Serial Number (DSN): 002A.

be no discharge of floating solids or visible foam in other than trace amounts. There shall le sheen.

iation 'N/A', in the table below denotes 'Not Applicable' while the abbreviation 'NL',)t Limited' with both monitoring and reporting required.

:al data shall be reported on Discharge Monitoring Reports (DMRs).

ken in compliance with the specified monitoring requirements shall be taken at the ocation: at the exit port of the groundwater treatment system and prior to entering the storm r to the diagram on Page 3 of 5 pages of Part III-B/C); and shall be reported monthly.

:R	DISCHARGE REQUIREMENT					MONITORING REQUIREMENT
	Units	Daily Minimum	Monthly Average	Daily Maximum	Minimum Frequency	Sample Type
√	GPD	NA	NL	NL	monthly	meter (1)
	s.u	6.0	NA	8.5	monthly	grab
gen Demand	mg/l	NA	NL	50	quarterly	grab
ed Solids √	mg/l	NA	NL	40	quarterly	grab
√	ug/l	NA	NL	7	monthly	grab
hane √	ug/l	NA	NL	3	quarterly	grab
	ug/l	NA	22	59	quarterly	grab
‹yl)Phthalate √	ug/l	NA	NL	30	quarterly	grab
ıylene √	ug/l	NA	NL	9	quarterly	grab
√	ug/l	NA	50	100	quarterly	grab
√	ug/l	NA	NL	1	monthly	grab
ity, IC25 c Units] √	%	61	NA	[1.6*]	quarterly	See Part IV-B/C

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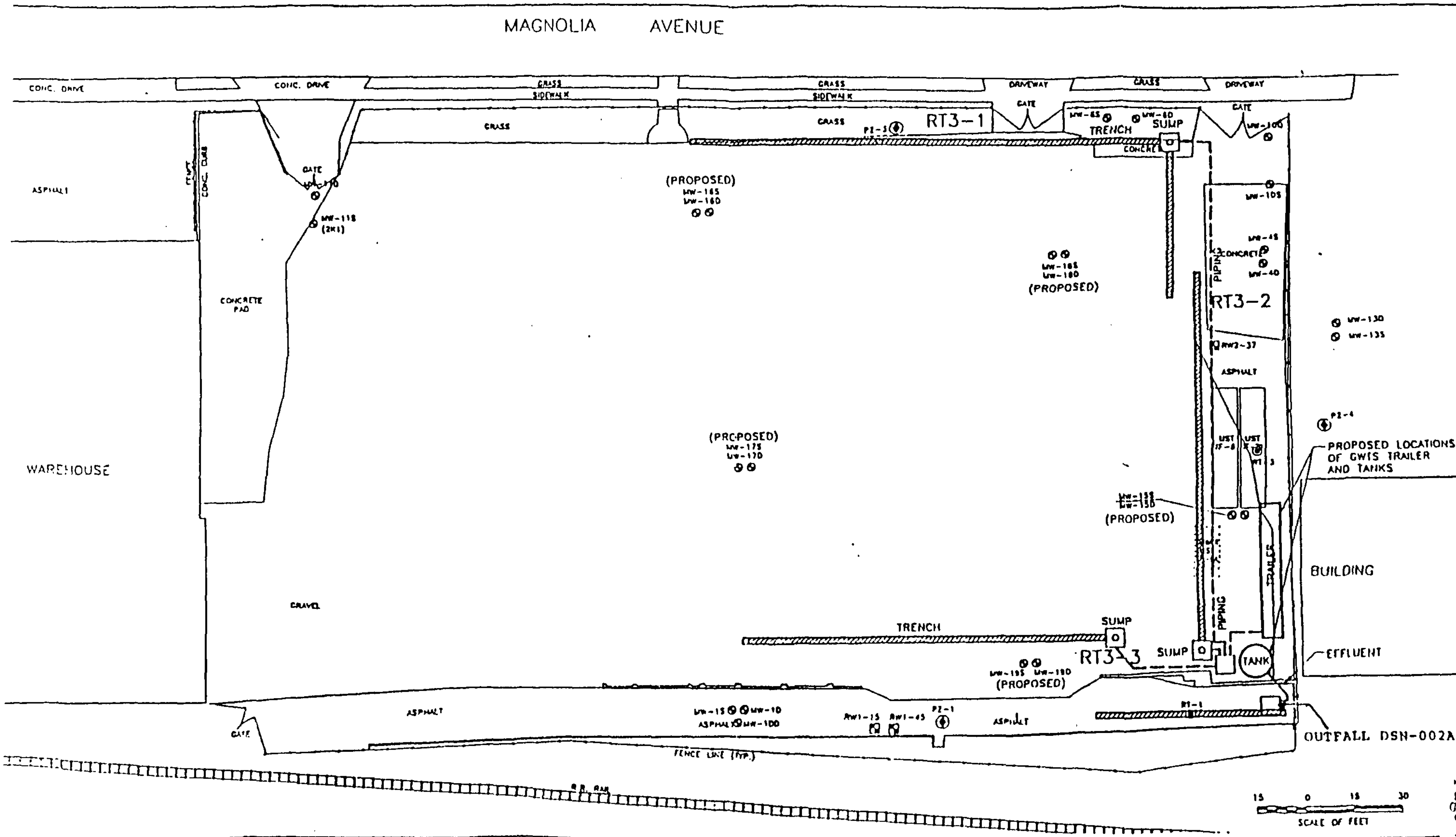
PARAMETER	DISCHARGE REQUIREMENT					MONITORING REQUIREMENT
	Units	Daily Minimum	Monthly Average	Daily Maximum	Minimum Frequency	Sample Type
PCB-1242	ug/l	NA	NL	NL	quarterly	grab
PCB1254	ug/l	NA	NL	NL	quarterly	grab
PCB-1221	ug/l	NA	NL	NL	quarterly	grab
PCB-1232	ug/l	NA	NL	NL	quarterly	grab
PCB-1248.	ug/l	NA	NL	NL	quarterly	grab
PCB-1260	ug/l	NA	NL	NL	quarterly	grab
PCB-1016	ug/l	NA	NL	NL	quarterly	grab

(1) The flow is measured by use of a flow meter.
* - This limitation is equivalent to a maximum of 1.6 TU_c's (chronic toxic units).
mg/l - milligrams per liter ug/l - micrograms per liter g/day - grams per day kg/day - kilograms per liter
s.u. - standard units mgd - million gallons per day

NOTE

The permittee shall monitor for PCBs quarterly for EDP + one year using an approved methodology and RQL. If these four sample results indicate nondetectable levels, upon written request from the permittee and written approval from the Department, the above monitoring frequency may be reduced to semi-annually.



LEGEND:	SCALE: 1"=30'	CHECKED BY: B.M.	ECM environmental compliance monitoring, inc.	HULS AMERICA INC., ELIZABETH, NEW JERSEY	DESCRIPTION: FIGURE 2 MONITORING WELL, RECOVERY WELL AND RECOVERY TRENCH LOCATIONS AT 830 MAGNOLIA AVENUE
RAZED STRUCTURE; TRENCH; PIEZOMETER (WATER LEVELS ONLY); RECOVERY WELL	DATE: 5/18/99	DRAWING NO: F2M1			

Part III-B/C
Permit No. NJ0102270
Page 4 of 6 pages

959270528

3. EFFLUENT MONITORING REQUIREMENTS FOR TOXIC PARAMETERS

If the permittee and/or contract laboratory determines that the detection levels achieved for any pollutant(s) generally will not be as sensitive as the Recommended Quantitation Levels (RQLs) specified in Part IV-Appendix I, the permittee must submit a justification of such to the Bureau of Point Source Permitting – Region 2 at the address listed in the cover letter. Pollutants that are detected but not quantified must be reported as such on the lab sheets and on the Discharge Monitoring Reports. Pollutants shall be monitored and reported in the same form as they are given in Part IV-Appendix I.

4. MODIFICATION OF MONITORING REQUIREMENTS

The permittee may request a modification of their permit to decrease monitoring frequencies for limited parameters if site specific conditions indicate applicability of such a modification. The Department will consider reducing the monitoring frequency of a limited parameter provided that:

a) ELGs applicable to the facility do not specify the required monitoring frequency;

b) the frequency reduction conditions are included in the draft permit, which has been public noticed;

c) there has been no material change in the composition of the wastewater during the specified monitoring period;

d) the permittee has shown consistent compliance with all permit conditions for the affected parameter(s) for:
   1) a minimum period of three (3) years for a monitoring frequency of monthly;
   2) a minimum period of five (5) years for a monitoring frequency of quarterly; and
   3) a minimum period of eight tests for Whole Effluent Toxicity (WET) limitations;

A monitoring frequency can be reduced as follows:
1) from monthly to quarterly; or
2) from quarterly to semi-annually or annually.

For WET limitations, monitoring frequencies can be reduced as follows:
1) a minimum of twice per year for major dischargers; and
2) a minimum of annually for minor dischargers.

Reduction of monitoring frequency is not automatic; the Department shall determine whether or not a reduction is warranted. The Discharge Monitoring Reports (DMRs) shall be reviewed to verify consistent compliance with permit limitations and conditions for the affected parameter(s).

If the Department agrees to grant the request, the Department will perform a conditional change to the permit to change the monitoring frequency of the affected parameters.

A request for a modification of the monitoring frequency should be sent to the Chief of the Bureau of Permit Management, P.O. Box 29, Trenton, New Jersey 08625. A copy of the letter should also be sent to the Chief of the Bureau of Point Source Permitting-Region 2.

5. TOXIC POLLUTANT REOPENER CLAUSE

Pursuant to N.J.A.C. 7:14A-6.2(a)(10)(iii), the Department may modify or revoke and reissue any permit to incorporate limitations or requirements to control the discharge of toxic pollutants, including whole effluent, chronic and acute toxicity requirements, chemical specific limitations or toxicity reduction requirements, as applicable.

I. Toxicity Testing Requirements

The permittee shall conduct chronic toxicity tests on its wastewater discharge DSN 001 in accordance with the provisions in this section. Such testing will determine if appropriately selected effluent concentrations adversely affect the test species.

A. Chronic Toxicity Testing Requirements

1. Chronic toxicity tests shall be conducted using the *Ceriodaphnia dubia*, 3 brood survival and reproduction test (Method 1002.0). If a test does not meet the specifications contained in the Department's "Chronic Toxicity Testing Specifications For Use In The NJPDES Permit Program," that test must be repeated within 30 days of the completion of the initial test.

2. Test results shall be expressed as the IC25 for each test endpoint. Where a chronic toxicity testing methodology yields IC25s from more than one test endpoint, the most sensitive endpoint will be used to determine permit compliance.

B. Monitoring Requirements

1. The monitoring frequency for chronic toxicity shall be quarterly.

2. Effluent samples for whole effluent toxicity shall be the last treatment step, consistent with the collection location for other parameters. An alternate sampling location may be designated by the Department where such a sampling location is deemed appropriate.

C. Reporting Requirements

2. A fully completed "Methodology Questionnaire for Chronic Toxicity Tests" which includes an identification of the toxicity testing laboratory responsible for the testing shall be submitted to the address below within EDP + 2 months . This information must also be resubmitted within two months of a change of contract laboratory. Copies of these forms are provided to certified laboratories and may also be obtained by contacting the address below.

3. Chronic toxicity test results shall be reported on the "NJPDES Biomonitoring Report Form Chronic Toxicity Tests", respectively, copies of which are provided to certified laboratories. Copies of these report forms may also be obtained by contacting the address below. TWO COPIES of each completed report form shall be submitted within 60 days of test completion to:

New Jersey Department of Environmental Protection
Division of Water Quality, Bureau of Point Source Permitting Region 2
P.O. Box 29
Trenton, New Jersey 08625
Attention: Biomonitoring Program

4. THE TEST RESULTS SHALL BE REPORTED ON THE PERMITTEE'S DISCHARGE MONITORING REPORT (DMR) FOR THE MONITORING PERIOD DURING WHICH THE TEST WAS CONDUCTED.

II. Toxicity Reduction Implementation Requirements (TRIR)

A. The permittee shall initiate a tiered toxicity investigation as specified at N.J.A.C. 7:14A-13.17(a)4 if a minimum of two out of six consecutive WET tests demonstrate that the effluent does not comply with the chronic toxicity limit contained in Part III of this permit. Any test results excluded from these TRIRs as specified at N.J.A.C. 7:14A-13.17(a)2 must be approved in writing by the Department.

B. Tiered Investigation

1. Toxicity Characterization Phase (TCP)

(a) Within 30 days of the close of the monitoring period which contained the second exceedance referenced in A. above, the permitte shall initiate a TCP as specified at N.J.A.C. 7:14A-13.17(a)4. The data collected in the TCP will be used to characterize effluent variability and to identify the magnitude and frequency of toxicity.

(b) If the results of four consecutive tests conducted during the TCP do not exceed the chronic toxicity limit in this permit, the permittee may return to the original monitoring frequency specified in Part III of this permit and the TRIRs of this permit are considered complete. If in the future, however, two of any six consecutive, acceptable tests conducted at the frequency specified in Part III again exceed the chronic toxicity limit contained in this permit, the TCP shall again be initiated as specified in 1.(a) above.

2. Preliminary Toxicity Investigation (PTI)

(a) Upon the fourth exceedance of the chronic toxicity limit conducted during the TCP, a PTI shall be initiated as specified at 13.17(a)4.ii.

3. Comprehensive Toxicity Investigation (CTI)

(a) Where at the completion of the PTI the effluent does not demonstrate consistent compliance with the chronic toxicity limit, consistent with C. below, a CTI shall be initiated as specified at N.J.A.C. 7:14A-13.17(a)7.

(b) Within 90 days of the CTI completion, the permittee shall submit to the Department the final results. These results shall include the corrective actions identified as necessary to reduce the toxicity to permit limitation levels and a schedule for completion of the identified actions.

(c) Upon receipt of written approval from the Department of the corrective action schedule, the permittee shall implement those corrective actions consistent with that schedule. Once corrective action(s) are implemented, the permittee shall conduct testing as specified in C. below to demonstrate consistent compliance. If, for any reason, the implemented measures do not result in consistent compliance with the toxicity limit as defined in C. below, the permittee shall submit to the Department a plan for resuming the CTI.

(d) The CTI shall not be complete until the permittee has demonstrated consistent compliance with the toxicity limitation in the permit as defined in C. below, using the more frequent period of monitoring specified therein. The Department may extend the time frame for completing the investigation where reasonable justification exists. A request for an extension must be made in writing and must include justification and supporting data for such a request.

C. Demonstration of Consistent Compliance

1. If at any time during or at the completion of the PTI or CTI, the cause of the toxicity is identified and necessary corrective actions are implemented by the facility, the permittee shall then initiate the monitoring referenced in item C.2. below to demonstrate consistent compliance. If toxicity test results indicate consistent compliance as defined therein, the permittee may return to the monitoring frequency specified in Part III of this permit.

2. A demonstration of consistent compliance shall consist of four consecutive chronic toxicity tests conducted on a semi-monthly basis which meet the chronic toxicity limit contained in Part III of this permit.

D. Extension of the Toxicity Reduction Implementation Requirements

1. The Department may modify established compliance schedules or any time frame established within these TRIRs, to attain compliance with an chronic toxicity limit, where it determines that reasonable justification exists and where such justification is provided by the permittee in a timely manner.

2. If the Department has determined that the permittee has complied with the requirements of these TRIRs and the permittee satisfactorily demonstrates no readily available alternative to remedy toxicity and/or identifiable cause of effluent toxicity, the Department may extend the referenced compliance schedule for continued investigations and/or development and/or implementation of necessary control measures by written notification to the permittee.

3. At the occurrence of D.2. above, the Department may modify this permit to reduce the monitoring provisions and/or revise the compliance schedule so as to not cause unnecessary financial hardship to a permittee. The permittee, however, shall continue to investigate all reasonable measures to attain consistent compliance with the toxicity limit. Such measures would be determined at the time of permit modification and would be subject to the procedures specified at N.J.A.C. 7:14A-16.

E. Monitoring and Reporting Requirements

1. During the PTI or CTI, the permittee shall conduct chronic testing at the monitoring frequency specified in Part III of the permit. A permittee may elect to conduct testing at a greater frequency to obtain additional data.

2. Progress reports shall be submitted during the conduct of these TRIRs as specified at N.J.A.C. 7:14A-13.17(a).

CHRONIC TOXICITY TESTING SPECIFICATIONS

FOR USE IN THE NJPDES PERMIT PROGRAM

Version 2.1

May 1997

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Notice: Mention of trade names or commercial products do not constitute endorsement or recommendation for use.

I. AUTHORITY AND PURPOSE

These methods specifications for the conduct of whole effluent chronic toxicity testing are established under the authority of the NJPDES permitting program, N.J.A.C. 7:14A-6.5(a)2 and 40 CFR 136, for discharges to waters of the State. The methods referenced herein are included by reference in 40 CFR 136, Table 1.A. and, therefore, constitute approved methods for chronic toxicity testing. The information contained herein serves to clarify testing requirements not sufficiently clarified in those methods documents and also serves to outline and implement the interlaboratory Standard Reference Toxicant Program until a formal laboratory certification program is established under N.J.A.C. 7:18. As such these methods are intended to be used to determine compliance with discharge permits issued under the authority of the NJPDES permit program. Tests are to be conducted in accordance with the general conditions and test organism specific method specifications contained in this document. All other conditions and specifications can be found in 40 CFR 136 and USEPA methodologies.

Until a subchapter on chronic toxicity testing within the regulations governing the certification of laboratories and environmental measurements (N.J.A.C. 7:18) becomes effective, tests shall be conducted in conformance with the methodologies as designated herein and contained in 40 CFR 136. The laboratory performing the testing shall be within the existing acute toxicity testing laboratory certification program established under N.J.A.C. 7:18, as required by N.J.A.C. 7:9B-1.5(c)5.

Testing shall be in conformance with the subchapter on chronic toxicity testing within the N.J.A.C. 7:18 when such regulations become effective. The laboratory performing the toxicity testing shall be within the chronic toxicity testing laboratory certification program to be established under that subchapter, when it becomes effective.

These methods are incorporated into discharge permits as enforceable permit conditions. Each discharge permit will specify in Part IV of the permit, the test species specific methods from this document that will be required under the terms of the discharge permit. Although the test species specific methods for each permit are determined on a case-by-case basis, the purpose of this methods document is to assure consistency among dischargers and to provide certified laboratories with information on the universe of tests to be utilized so that they can make the necessary preparations, including completing the required Standard Reference Toxicant testing. Please note that these methodologies are required for compliance testing only. Facilities and/or laboratories conducting testing under the requirements of a Toxicity Identification Evaluation or for informational purposes are not bound by these methods.

This document constitutes the second version of the NJDEP's interim chronic methodologies. This version contains no significant changes to the test methods themselves. However, in keeping with the Department's continued emphasis on good laboratory practices and quality control, the areas addressing the Standard Reference Toxicant Program, data analysis and data reporting, have been significantly revised.

II. GENERAL CONDITIONS

A. LABORATORY SAFETY, GLASSWARE, ETC.

All safety procedures, glassware cleaning procedures, etc., shall be in conformance with 40 CFR 136 and USEPA's "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms," "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms" and N.J.A.C. 7:18.

B. TEST CONCENTRATIONS / REPLICATES

All testing is to be performed with a minimum of five effluent concentrations plus a dilution water control. A second reference water control is optional when a dilution water other than culture water is used. The use of both a 0.5 or 0.75 dilution factor is acceptable for the selection of test concentrations. If hypothesis testing will be used to determine the test endpoint, one effluent concentration shall be the chronic permit limitation, unless the existing data for the discharge indicate that the NOEC is expected to be significantly less than the permit limit. The use of the 0.5 dilution factor may require more than five dilutions to cover the entire range of effluent concentrations as well as the chronic permit limit, since the permit limit will often not be one of the nominal concentrations in a 0.5 dilution series. In such an instance, the 0.5 dilution series may be altered by including an additional test concentration equal to the permit limit in the dilution series, or by changing the concentration closest to the permit toxicity limit to be equal to that limit. The Department recommends the use of the 0.75 dilution factor using Table 1.0 to determine test concentrations. That table establishes test concentrations based on the chronic toxicity limitation.

For either the 0.5 or 0.75 dilution factor, there shall be at least one test concentration above the permit limitation and at least three test concentrations below the permit limit along with the dilution water control unless the permit limitation prohibits such (e.g., limitations greater than 75% effluent). An effort shall be made to bracket the anticipated test result.

To use Table 1.0, locate the permit limit in column 4. The dilution series becomes the row that corresponds to the permit limit in column 4. For example, a permit limit of 41 would require a dilution series of the dilution water control, 17%, 23%, 31%, 41% and 55% effluent.

The number of replicates used in the test must, at a minimum, satisfy the specifications of the applicable methods contained herein. Increased data sensitivity can be obtained by increasing the number of replicates equally among test concentrations and thus an increased number of replicates is acceptable. Further, the use of nonparametric statistical analysis requires a minimum of four replicates per test concentration. If the data for any particular test is not conducive to parametric analyses and if less than four replicates were included, the test may not be considered acceptable for compliance purposes.

The use of single concentration tests consisting of the permit limitation as a concentration and a control is not permitted for compliance purposes, but may be used by a permittee in the conduct of a Toxicity Investigation Evaluation (TIE) or for information gathering purposes. Such a test would be considered a "pass" if there was no significant difference in test results, using hypothesis testing methods.

Table 1.0: 0.75 DILUTION SERIES INDEXED BY PERMIT LIMIT

				Permit Limit						Permit Limit	
Col #	1	2	3	4	5	Col #	1	2	3	4	5
	0.4	0.6	0.8	1	1.3		22	29	38	51	68
	0.8	1.1	1.5	2	2.7		22	29	39	52	69
	1.3	1.7	2.3	3	4		22	30	40	53	71
	1.7	2.3	3	4	5.3		23	30	41	54	72
	2.1	2.8	3.8	5	6.7		23	31	41	55	73
	2.5	3.4	4.5	6	8		24	32	42	56	75
	3	4	5	7	9		24	32	43	57	76
	3	5	6	8	11		24	33	44	58	77
	4	5	7	9	12		25	33	44	59	79
	4	6	8	10	13		25	34	45	60	80
	5	6	8	11	15		26	34	46	61	81
	5	7	9	12	16		26	35	47	62	83
	5	7	10	13	17		27	35	47	63	84
	6	8	11	14	19		27	36	48	64	85
	6	8	11	15	20		27	37	49	65	87
	7	9	12	16	21		28	37	50	66	88
	7	10	13	17	23		28	38	50	67	89
	8	10	14	18	24		29	38	51	68	91
	8	11	14	19	25		29	39	52	69	92
	8	11	15	20	27		30	39	53	70	93
	9	12	16	21	28		30	40	53	71	95
	9	12	17	22	29		30	41	54	72	96
	10	13	17	23	31		31	41	55	73	97
	10	14	18	24	32		31	42	56	74	99
	11	14	19	25	33		32	42	56	75	100
	11	15	20	26	35	24	32	43	57	76	
	11	15	20	27	36	24	32	43	58	77	
	12	16	21	28	37	25	33	44	59	78	
	12	16	22	29	39	25	33	44	59	79	
	13	17	23	30	40	25	34	45	60	80	
	13	17	23	31	41	26	34	46	61	81	
	14	18	24	32	43	26	35	46	62	82	
	14	19	25	33	44	26	35	47	62	83	
	14	19	26	34	45	27	35	47	63	84	
	15	20	26	35	47	27	36	48	64	85	
	15	20	27	36	48	27	36	48	65	86	
	16	21	28	37	49	28	37	49	65	87	
	16	21	29	38	51	28	37	50	66	88	
	16	22	29	39	52	28	38	50	67	89	
	17	23	30	40	53	28	38	51	68	90	
	17	23	31	41	55	29	38	51	68	91	
	18	24	32	42	56	29	39	52	69	92	
	18	24	32	43	57	29	39	52	70	93	
	19	25	33	44	59	30	40	53	71	94	
	19	25	34	45	60	30	40	53	71	95	
	19	26	35	46	61	30	41	54	72	96	
	20	26	35	47	63	31	41	55	73	97	
	20	27	36	48	64	31	41	55	74	98	
	21	28	37	49	65	31	42	56	74	99	
	21	28	38	50	67	32	42	56	75	100	

* Select the dilution series by finding the row which contains the permit limit in column #4.
NOTE: All values are in units of "% effluent" not toxic units.

C. DILUTION WATER

1. Marine and Estuarine Waters

A high quality natural water, such as the Manasquan River Inlet is strongly recommended as the dilution water source for chronic toxicity testing with marine and estuarine organisms. The use of the receiving water as the dilution water source is not required. Saline waters prepared with hypersaline brine and deionized water may also be used as dilution water. Hypersaline brines shall be prepared from a high quality natural seawater and shall not exceed a concentration of 100 ppt. The type of a dilution water for a permittee may not be changed without the prior approval of the Department.

The standard test salinity shall be 25 ppt, except for *Champia parvula,* which shall be tested at 30 ppt. Since most effluents are freshwater based, in most cases it will be necessary to adjust the salinity of the test concentrations to the standard test salinity.

2. Fresh Waters

A high quality natural water, such as Round Valley Reservoir (if access is allowed) or Lake Hopatcong, is strongly recommended as the dilution water source for chronic toxicity testing with freshwater organisms. It is not required to perform the toxicity testing with the receiving water as dilution water. Tests performed with a reconstituted water or up to 20% Diluted Mineral Water (DMW) as dilution water is acceptable. For testing with *Ceriodaphnia dubia*, the addition of 5 μg/l selenium (2 μg/l selenium with natural water) and 1 μg/l vitamin B12 is recommended (Keating and Dagbusan, 1984: Keating, 1985 and 1988). The source of a dilution water for a permittee may not be changed without the prior approval of the Department. Reconstituted water and DMW should be prepared with Millipore Super Q^R or equivalent, meet the requirements of N.J.A.C. 7:18-6 and should be aerated a minimum of 24 hrs prior to use, but not supersaturated.

D. EFFLUENT SAMPLE COLLECTION

Effluent samples shall be representative of the discharge being regulated. For each discharge serial number (DSN), the effluent sampling location shall be the same as that specified in the NJPDES permit for other sampling parameters unless an alternate sampling point is specified in the NJPDES discharge permit. For industrial dischargers with a combined process/sanitary waste stream, effluent sampling shall be after chlorination, unless otherwise designated in the permit.

For continuous discharges, effluent sampling shall consist of 24 hour composite samples consisting either of equal volumes taken once every hour or of a flow-proportionate composite sample, unless otherwise approved by the Department. At a minimum, three samples shall be collected as specified above, one every other day. The first sample shall be used for test initiation and the first renewal. The second sample for the next two renewals. The third sample shall be used for the final three renewals. For the *Champia* and *Selenastrum* tests, a single sample shall be collected not more than 24 hours prior to test initiation. No effluent sample shall be over 72 hours old at the time of its use to initiate or renew solutions in a test. It is acceptable to collect samples more frequently for chronic WET testing and if samples are collected daily for acute toxicity testing conducted concurrently, available samples may be used to renew the test solutions as appropriate.

For all other types of discharges, effluent sampling shall be conducted according to specifications contained within the discharge permit, methodology questionnaire or as otherwise specified by the Department. The use of grab samples or other special sampling procedures will be based on time of occurrence and duration of intermittent discharge events.

If a municipal discharger has concerns that the concentrations of ammonia and/or chlorine in an effluent are adequate to cause violations of the permit limit for chronic toxicity testing, the permittee should conduct analyses, as specified in USEPA's toxicity investigation methods documents, to illustrate the relationship between chronic effluent toxicity and chlorine and/or ammonia as applicable. This data may then be submitted to the Department as justification for a request to use modified test procedures, which account for ammonia and/or chlorine toxicity, in future chronic toxicity tests. The Department may, where adequate justification exists, permit the adjustment of these pollutants in the effluent sample if discharge limits for these pollutants are contained in the NJPDES permit and those permit limitations are adequate for the protection of water quality. Any proposed modified test procedures to adjust effluent chlorine and/or ammonia shall be approved by the Department prior to use of those test procedures for any compliance testing.

Except for filtration through a 2 mm or larger screen or an adjustment to the standard test salinity, no other adjustments to the effluent sample shall be made without prior written approval by the Department. Aeration of samples prior to test start shall be minimized where possible and samples shall not be aerated where adequate saturation exists to maintain dissolved oxygen.

E. PHYSICAL CHEMICAL MEASUREMENTS

At a minimum, the physical chemical measurements shall be as follows:

- pH and dissolved oxygen shall be measured at the beginning and end of each 24 hour exposure period, in at least one chamber, of the high, medium and low test concentrations and the control. In order to ensure that measurements for these parameters are representative of the test concentrations during the test, measurements for these parameters should be taken in an additional replicate chamber for such concentrations which contains no test organisms, but is subject to the same test conditions.

- Temperature shall either be monitored continuously, measured daily in at least two locations in the environmental control system, or measured at the beginning of each 24 hr exposure period in at least one replicate for each treatment.

- Salinity shall be measured in all salt water tests at the beginning of each 24 hour exposure period, in at least one replicate for each treatment.

- For all freshwater tests, alkalinity, hardness and conductivity shall be measured in each new sample (100% effluent) and control.

- Nitrite, nitrate and ammonia shall be measured in the control before each renewal in the mysid test only.

- For samples of discharges where concentrations of ammonia and/or chlorine are known or are suspected to be sufficient to cause toxicity, it is recommended that the concentrations of these pollutants be determined and submitted with the standardized report form. The laboratory is advised to consult with the permittee to determine if these parameters should be measured in the effluent. Where such measurements are deemed appropriate, measurements shall be conducted at the beginning of each 24 hour exposure period. Also, since a rise in the test pH can affect the toxicity of ammonia in the effluent, analysis of ammonia during the test may be appropriate if a rise in pH is accompanied by a significant increase in mortality.

F. STATISTICS

The use of both hypothesis testing techniques and point estimate techniques are currently in use by the Department or by permittees for compliance purposes. The NJPDES permit should be checked to determine which type of analysis is required and appropriate for each specific facility. It is not acceptable to simply evaluate any data by "visual data review" unless in the analysis of survival data, no mortality occurred in the test. All data sets must be appropriately statistically evaluated.

For hypothesis testing techniques, statistical analysis shall follow the protocols in USEPA (1988, 1989) to evaluate adverse effects. A significance level of 0.05 shall be utilized to evaluate such effects. Use of a protocol not contained in these documents must be accompanied by a reference and explanation addressing its applicability to the particular data set. Please note the following when evaluating data using hypothesis testing techniques.

Special attention should be given to the omission and inclusion of a given replicate in the analysis of mysid fecundity data (USEPA 1994, p. 275) and *Ceriodaphnia* reproduction data (USEPA 1994, page 174).

Determination of acceptability criteria and average individual dry weight for the growth endpoints must follow the specifications in the applicable documents (e.g., p.84 for saltwater methods document.)

Use of nonparametric statistical analyses requires a minimum of four replicates per test concentration. If the data for any particular test are not conducive to parametric analyses and if less than four replicates were included, the test may not be acceptable to the Department.

Where hypothesis testing is used for compliance purposes, if the results of hypothesis testing indicate that a deviation from the dose response occurs such that two test concentrations are deemed statistically significant from the control but an intermediate test concentration is not, the test is deemed unacceptable and cannot be used for compliance testing purposes.

For point estimate techniques, statistical analysis should follow the protocol contained in "A Linear Interpolation Method for Sublethal Toxicity: The Inhibition Concentration (ICp) Approach (Version 2.0), July 1993, National Effluent Toxicity Assessment Center Technical Report 03-93." Copies of the program can be obtained by contacting the Department. The linear interpolation estimate ICp values and not the bootstrap mean ICp, shall be reported for permit compliance purposes. The ICp value reported on the Discharge Monitoring Report shall be rounded off as specified in the Department's "Discharge Monitoring Report (DMR) Instruction Manual, December 1993." IC25 values shall be reported under the parameter code listed as "NOEC" on the DMR, until the DMR's are adjusted accordingly.

If the result reported by the ICp method is greater than the highest concentration tested, the test result is reported as "greater than C" where "C" is the highest tested concentration. If the ICp is lower than the lowest concentration tested, the test result is reported as "less than C" where "C" is the lowest tested concentration.

If separate NOEC's/IC25's can be calculated from multiple test endpoints, for example a reproductive endpoint and a growth endpoint, the lowest NOEC/IC25 value expressed in units of "% effluent" will be used to determine permit compliance and should, therefore, be reported as the NOEC/IC25 value for the test. If the NOEC value for growth and/or reproduction is not lower than that for survival, the NOEC/IC25 value reported for the test shall be as survival. For saltwater tests, where additional controls are used in a test (i.e. brine and/or artificial sea salt control), a T-test shall be used to determine if there is a significant difference between the original test control and the additional controls. If there is a significant difference between any of the controls, the test may be deemed unacceptable and if so, will not be used for permit compliance.

III. TEST ACCEPTABILITY CRITERIA

Any test that does not meet these acceptability criteria will not be used by the Department for any purpose and must be repeated as soon as practicable, with a freshly collected sample.

1. Tests must be performed by a laboratory approved for the conduct of chronic toxicity tests and certified for acute toxicity testing under N.J.A.C. 7:18.

2. Test results may be rejected due to inappropriate sampling, including the use of less than three effluent samples in a test and/or use of procedures not specified in a permit or methodology questionnaire, use of frozen or unrefrigerated samples or unapproved pretreatment of an effluent sample.

3. Controls shall meet the applicable performance criteria specified in the Table 2.0 and in the individual method specifications contained herein.

4. Acceptable and applicable Standard Reference Toxicant Data must be available for the test.

5. No unapproved deviations from the applicable test methodology may be present.

6. When using hypothesis testing techniques, a deviation from the dose response as explained in the statistical portion of this document shall not be present in the data.

Table 2.0: CONTROL PERFORMANCE

TEST ORGANISM	MINIMUM SURVIVAL	MINIMUM WEIGHT GAIN	MINIMUM FECUNDITY/ REPRODUCTION
Pimephales promelas	80%	0.25 mg avg	N/A
Ceriodaphnia dubia	80%	N/A	Average of ≥15 young per surviving female
Selenastrum capricornutum	Density ≥2x10^5cells/ml	N/A	Variability in controls not to exceed 20%.
Cyprinodon variegatus	80%	0.60 mg (unpreserved) avg 0.50 mg (preserved) avg	N/A
Menidia beryllina	80%	0.50 mg (unpreserved) avg 0.43 mg (preserved) avg	N/A
Mysidopsis bahia	80%	0.2 mg per mysid avg	egg production by 50% of control females if fecundity is used as an endpoint.
Champia parvula	100%	N/A	≥10 cystocarps per plant Plants in controls and lower test concentrations shall not fragment so that individual plants cannot be identified.

THE DETERMINATION OF A TEST AS UNACCEPTABLE DOES NOT RELIEVE THE FACILITY FROM MONITORING FOR THAT MONITORING PERIOD

IV. STANDARD REFERENCE TOXICANT TESTING

All chronic testing shall be accompanied by testing with a Standard Reference Toxicant (SRT) as a part of each laboratory's internal quality control program. Such a testing program should be consistent with the quality assurance/quality control protocols described in the USEPA chronic testing manuals. Laboratories may utilize the reference toxicant of their choice and toxicants such as cadmium chloride, potassium chloride, sodium dodecyl sulfate and copper sulfate are all acceptable. However, Potassium chloride has been chosen by several laboratories and is recommended by the Department. The concentration of the reference toxicant shall be verified by chemical analysis in the low and high test concentrations once each year or every 12 tests, whichever is less. It is not necessary to run SRT tests, for all species using the same SRT.

A. INITIAL STANDARD REFERENCE TOXICANT (SRT) TESTING REQUIREMENTS

At a minimum, this testing shall include an initial series of at least five SRT tests for each test species method. Acceptable SRT testing for chronic toxicity shall be performed utilizing the short term chronic toxicity test methods as specified herein. Reference toxicant tests utilizing acute toxicity testing methods, or any method other than those contained in this document are not acceptable. The laboratory should forward results of the initial SRT testing, including control charts, the name of the reference toxicant utilized, the supplier and appropriate chemical analysis of the toxicant to either address listed in the reporting requirements section herein.

The initial series of a least five SRT tests for a specific test species method shall be completed and approved in writing by the Department prior to the conduct of any chronic toxicity testing for compliance purposes.

B. SUBSEQUENT SRT TESTING REQUIREMENTS

After receiving the initial approval from the Department to conduct chronic toxicity tests for compliance purposes, subsequent SRT testing shall be conducted as follows:

1. Where organisms used in testing are cultured at the testing laboratory, SRT testing should be conducted once per month for each species/method.

2. Where the laboratory purchases organisms from a laboratory certified in New Jersey for the conduct of acute toxicity testing and approved for the conduct of chronic toxicity testing for the test organism in question (i.e. the "supplier laboratory"), SRT data provided by the "supplier laboratory" for each lot of organisms purchased is acceptable as long as the SRT test result falls within the control limits of the control chart established by the "supplier laboratory" for that organism. The laboratory using purchased organisms is responsible for the results of any compliance tests they perform.

3. A testing laboratory purchasing organisms from a supplier laboratory must still perform SRT testing on a quarterly basis at a minimum, for each species they test with, in order to adequately document their own interlaboratory precision.

4. If a testing laboratory purchasing organisms elects not to use the SRT data from a "supplier laboratory" or such data is unavailable or where organisms are purchased from another organism supplier, the testing laboratory must conduct SRT testing on each lot of organisms purchased.

5. For industrial laboratories certified under N.J.A.C. 7:18 to conduct acute toxicity tests, only the SRT testing conditions specified in 2. through 4. above apply. Where that laboratory/facility cultures their own test organisms, the frequency of SRT testing required will be determined on a case by case basis, based on the frequency of testing for that facility.

NOTE: Based on these requirements, SRT data are considered applicable to a compliance test when the SRT test results are acceptable and the SRT test is conducted within 30 days of the compliance test, for the test species and SRT in question. Therefore, it is not necessary for an approved laboratory to run an SRT test every month if the laboratory is not conducting compliance tests for a particular species.

C. CHANGING OF AN ESTABLISHED REFERENCE TOXICANT

The SRT used for any species by a laboratory may be changed at any time provided that the following conditions have been satisfied:

1. A series of at least three reference toxicant tests are conducted with the new reference toxicant and the results of those tests are identified as satisfactory, in writing, by the Department.

2. Laboratories must continue using the already approved SRT in their ongoing QA/QC program, until such time as the letter referenced above, is received by the laboratory.

D. CONTROL CHARTS

Control charts shall be established from SRT test results in accordance with the procedures outlined in the USEPA methods documents. Control charts shall be constructed using IC25's using the following methods:

1. The upper and lower control limits shall be calculated by determining +/- two standard deviations above and below the mean.

2. SRT test results which exhibit an IC25 that is greater than the highest concentration tested or less than the lowest concentration tested (i.e. a definitive endpoint cannot be determined), shall not be used to establish control charts.

3. SRT tests which do not meet the acceptability criteria for a specific species shall not be used to establish control charts.

4. All values used in the control charts should be as nominal concentrations. However, the control charts shall be accompanied by a chart tabulating the test results as measured concentrations.

5. An outlier (i.e. values which fall outside the upper and lower control limits) should be included on the control chart unless it is determined that the outlier was caused by factors not directly related to the test organisms (e.g., test concentration preparation) as the source of variability would not be directly applicable to effluent tests. In such case, the result and explanation shall be reported to the Department within 30 days of the completion of the SRT test.

The control chart established for the initial series of SRT data submitted will be used by the laboratory and the Department to determine outliers from SRT test results reported in the "NJPDES Biomonitoring Report Form - Chronic Toxicity Test" submitted by the permittees for the test species. These initial control limits will remain unchanged until twenty SRT tests have been completed by the laboratory.

The following procedures shall be used for continually updating control charts after twenty acceptable SRT tests have been completed:

1. Once a laboratory has completed twenty acceptable SRT tests for a test species, the upper and lower control limits shall be recalculated with those twenty values.

2. For each successive SRT test conducted after these first twenty tests, a moving average shall be calculated and the control limits reevaluated using the last twenty consecutive test results.

3. The upper and lower control limits shall be reported on the "NJPDES Biomonitoring Report Form - Chronic Toxicity Tests" along with the SRT test result.

E. UNACCEPTABLE SRT TEST RESULTS

If a laboratory produces any SRT test results which are outside the established upper and lower control limits for a test species at a frequency greater than one test in any ten tests, a report shall be forwarded to the Department at the address contained herein. This report shall include any identified problem which caused the values to fall outside the expected range and the corresponding actions that have been taken by the laboratory. The Department may not accept or may require repeat testing for any toxicity testing that may have been affected by such an occurrence.

If a laboratory produces two consecutive SRT test results or three out of any ten test results which are outside the established upper and lower limits for a specific test species, the laboratory shall be unapproved to conduct chronic toxicity tests for compliance purposes for that test species. Reapproval shall be contingent upon the laboratory producing SRT test results within the established upper and lower control limits for that test species in two consecutive SRT tests. If one or both of those test results again fall outside the established control levels, the laboratory is unapproved for that test species until five consecutive test results within the established upper and lower control limits are submitted and approved by the Department.

F. ANNUAL SUBMITTALS

Control charts shall be forwarded to the Department on an annual basis, on the anniversary of approval for the test species.

The Department may request, at any time, any information which is essential in the evaluation of SRT results and/or compliance data.

V. TEST CANCELLATION / RESCHEDULING EVENTS

A lab may become aware of QA problems during or immediately following a test that will prevent data from being submitted or a lab may be unable to complete a tests due to sample collection or shipping problems. If for any reason a chronic toxicity test is initiated and then prematurely ended by the laboratory or at the request of the permittee, the laboratory shall submit the form entitled "Chronic Whole Effluent Toxicity Testing Test Cancellation / Rescheduling Event Form" contained herein. This form shall be used to detail the reason for prematurely ending the test. This completed form and any applicable raw data sheets shall be submitted to the appropriate biomonitoring program at the address above within 30 days of the cessation of the test.

Tests are considered to be initiated once test organisms have been added to all test chambers.

Submission of this form does not relieve the facility from monitoring for that monitoring period.

VI. REPORTING

The report form entitled "NJPDES Biomonitoring Report Form - Chronic Toxicity Tests" should be used to report the results of all NJPDES chronic compliance biomonitoring tests. Laboratory facsimiles are acceptable but must contain all information included on any recent revisions of the form by the Department. Statistical printouts and raw data sheets for all endpoints analyzed shall be included with the report submitted to the Department. Two copies of all chronic toxicity test report forms shall be submitted to the following address as applicable:

Bureau of Point Source Permitting Region 1 **OR**
Bureau of Point Source Permitting Region 2 (as indicated in the cover letter)

New Jersey Department of Environmental Protection
Division of Water Quality
PO Box 29
Trenton, NJ 08625-0029

It is not necessary to attach a copy of a test report form to the Discharge Monitoring Report (DMR) form when submitting this form to the Department. However, the results of all chronic toxicity tests conducted for compliance purposes must be reported on the DMR form under the appropriate parameter code in the monitoring period in which the test was conducted.

VII. METHOD SPECIFICATIONS

The following method specifications shall be followed as specified in the NJPDES permit. Any changes to these methods will not be considered acceptable unless they are approved in writing by the Department, prior to their use.

A. Fathead Minnow (*Pimephales promelas*), Larval Survival and Growth Test, method 1000.0
B. *Ceriodaphnia dubia*, Survival and Reproduction Test, method 1002.0
C. Algal, (*Selenastrum capricornutum*), Growth Test, method 1003.0
D. Sheepshead Minnow (*Cyprinodon variegatus*), Larval Survival and Growth Test, method 1005.0
E. Inland Silverside (*Menidia beryllina*), Larval Survival and Growth Test, method 1006.0
F. *Mysidopsis bahia*, Survival, Growth, and Fecundity Test, method 1007.0
G. *Champia parvula*, Sexual Reproduction Test, method 1009.0

VIII. REFERENCES

1. Keating, K. 1985. The influence of Vitamin B12 deficiency on the reproduction of Daphnia pulex Leydig (Cladocera). J. Crustacean Biology 5:130-136.

2. Keating, K. 1988. N.J.D.E.P. Project C29589, Fiscal 1988 Third Quarter Summary Report. Producing Nutritionally Competent Daphnids for Use in Bioassay. 44p.

3. Keating, K., and B. Dagbusan. 1984. Effect of selenium deficiency on cuticle integrity in Cladocera (Crustacea). Proc. Natl. Acad. Sci. USA 81:3433-3437.

4. NJDEP, 1993. Discharge Monitoring Report (DMR) Instruction Manual.

5. USEPA. 1994. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. EPA-600/4-91-003. July 1994. Second Edition.

6. USEPA. 1994. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA/600/4-91/002. July 1994. Third Edition.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PO Box 29
TRENTON, NEW JERSEY 08625-0029
BIOMONITORING PROGRAM

CHRONIC WHOLE EFFLUENT TOXICITY TESTING
TEST CANCELLATION / RESCHEDULING EVENT FORM

THIS FORM IS TO BE COMPLETED AND SUBMITTED TO THE DEPARTMENT DIRECTLY BY THE LABORATORY CONDUCTING CHRONIC TOXICITY TESTS WHENEVER A CHRONIC TOXICITY TEST IS PREMATURELY ENDED FOR ANY REASON

NJPDES No.: ____________________

FACILITY NAME: ____

LOCATION: ____

CONTACT: ______________________________ PHONE: ____________________

CANCELLATION EVENT:

LABORATORY NAME / NUMBER: ____

CONTACT: ____

TEST START DATE: _____/_____/_____ TEST END DATE: _____/_____/_____

REASON FOR CANCELLATION: ____

____

____

____

____

____

EFFLUENT SAMPLING:

SAMPLING POINT / DESCRIPTION OF SAMPLING SITE: ______________________________

____

SAMPLING INITIATED: DATE: ___/___/___ TIME: __________

SAMPLING ENDED: DATE: ___/___/___ TIME: __________

NUMBER OF EFFLUENT SAMPLES COLLECTED: ________________

SAMPLE TYPE (GRAB/COMPOSITE): ______________________________

RECEIVED IN LAB BY/FROM: ____

____

METHOD OF SHIPMENT: ____

(ALL APPLICABLE RAW DATA SHEETS MUST BE ATTACHED)

c: Permittees authorized agent.

TABLE III-A-2

Parameter Type or Name	RQL (µg/L)	Parameter Type or Name	RQL (µg/L)
BASE/NEUTRAL COMPOUNDS		**BASE/NEUTRAL COMPOUNDS (CONT.)**	
Acenaphthylene	10	N-Nitrosodi-N-Propylamine	20
Acenaphthene	9.5	N-Nitrosodiphenylamine	20
Anthracene	10	Phenanthrene	10
Benzidine	50	Pyrene	20
Benzo (a) Anthracene	10	1,2,4-Trichlorobenzene	10
Benzo (a) Pyrene	20		
3, 4-Benzofluoranthene	N/A		
Benzo (ghi) Perylene	20	**PESTICIDES**	
Benzo (k) Fluoranthene	20	Aldrin	0.04
Bis (2-Chloroethoxy) Methane	26.5	Alpha-BHC	0.02
Bis (2-Chloroethyl) Ether	10	Beta-BHC	0.04
Bis (2-Chloroisopropyl) Ether	10	Gamma-BHC (Lindane)	0.03
Bis (2-Ethylhexyl) Phthalate	30	Delta-BHC	0.02
4-Bromophenyl Phenyl Ether	9.5	Chlordane	0.2
Butyl Benzyl Phthalate	20	4,4'-DDT	0.06
2-Chloronaphthalene	9.5	4,4'-DDE	0.04
4-Chlorophenyl Phenyl Ether	21	4,4'-DDD	0.04
Chrysene	20	Dieldrin	0.03
Dibenzo (a,h) Anthracene	20	Alpha-Endosulfan	0.02
1,2-Dichlorobenzene	9	Beta-Endosulfan	0.04
1,3-Dichlorobenzene	9	Endosulfan Sulfate	0.08
1,4-Dichlorobenzene	20	Endrin	0.04
3,3'-Dichlorobenzidine	60	Endrin Aldehyde	0.1
Diethyl Phthalate	10	Heptachlor	0.02
Dimethyl Phthalate	10	Heptachlor Epoxide	0.4
Di-N-Butyl Phthalate	20	PCB-1242	N/A
2,4-Dinitrotoluene	10	PCB-1254	N/A
2,6-Dinitrotoluene	9.5	PCB-1221	N/A
Di-N-Octyl Phthalate	N/A	PCB-1232	N/A
1,2-Diphenylhydrazine (as Azobenzene)	N/A	PCB-1248	N/A
Fluoranthene	10	PCB-1260	N/A
Fluorene	10	PCB-1016	N/A
Hexachlorobenzene	10	Toxaphene	1
Hexachlorobutadiene	10		
Hexachlorocyclopentadiene	10		
Hexachloroethane	10		
Indeno (1,2,3-cd) Pyrene	20		
Isophorone	10		
Naphthalene	8		
Nitrobenzene	10		
N-Nitrosodimethylamine	20		

TABLE III-A-2 (continued)

Parameter Type or Name	RQL (µg/L)	Parameter Type or Name	RQL (µg/L)
METALS & CYANIDE		VOLATILES	
Antimony, Total	20	Acrolein	50
Arsenic, Total Recoverable	8	Acrylonitrile	50
Barium, Total *(Freshwater only)*	20	Benzene	7
Beryllium, Total	20	Bromoform	8
Cadmium, Total Recoverable	4	Carbon Tetrachloride	6
Chromium, Total Recoverable	10	Chlorobenzene	6
Copper, Total Recoverable (1)	10	Chlorodibromomethane	6
Lead, Total Recoverable (1)	10	Chloroethane	N/A
Mercury, Total Recoverable	1	2-Chloroethylvinyl Ether	N/A
Nickel, Total Recoverable	10	Chloroform	5
Selenium, Total Recoverable	10	Dichlorobromomethane	5
Silver, Total Recoverable	2	1,1-Dichloroethane	23.5
Thallium, Total	10	1,2-Dichloroethane	3
Zinc, Total Recoverable (1)	30	1,1-Dichloroethylene	6
Cyanide, Total	40	1,2-Dichloropropane	5
Phenols, Total	N/A	1,3-Dichloropropylene	7
		Ethylbenzene	6
ACID COMPOUNDS		Methyl Bromide	9
2-Chlorophenol	20	Methyl Chloride	10
2,4-Dichlorophenol	10	Methylene Chloride	6
2,4-Dimethylphenol	13.5	1,1,2,2-Tetrachloroethane	10
4,6-Dinitro-O-Cresol	60	Tetrachloroethylene	9
2,4-Dinitrophenol	40	Toluene	6
2-Nitrophenol	18	1,2-trans-Dichloroethylene	4
4-Nitrophenol	12	1,1,1-Trichloroethane	6
P-Chloro-M-Cresol	N/A	1,1,2-Trichloroethane	6
Pentachlorophenol	30	Trichloroethlyene	5
Phenol	10	Trichlorofluoromethane	5
2,4,6-Trichlorophenol	20	Vinyl Chloride	10

TABLE III-A-2 notes:

N/A: Recommended Quantitation Level equals five times the method detection level achieved by the laboratory

ECM
environmental compliance monitoring, inc.

March 1, 2005

Mr. Michael Buriani
New Jersey Department of Environmental Protection
Bureau of Environmental Evaluation
Cleanup and Responsibility Assessment
401 East State Street, 5th Floor
P.O. Box 432
Trenton, New Jersey 08625-0432

RE: **Site Development**
Degussa Corporation Inc. (Formerly Nuodex Inc.)
Elizabeth, New Jersey
ISRA Case No. 85374
ECM Project # 1085

Dear Mr. Buriani:

Per our recent telephone conversation, this letter was prepared to present the New Jersey Department of Environmental Protection (NJDEP) the anticipated site development plans for the above referenced site. The site development plans are complete and have been approved by the City of Elizabeth. The current site owner (LSD Developers, LCC) is preparing to proceed with site development during April of 2005.

Based on review of the plans, a building will occupy a significant portion of the 830 Magnolia Avenue property, and will potentially impact several of the site monitoring wells. To ensure current, proposed and future remedial activities at the site are not interrupted, several site monitoring wells, which are currently located within the building foot print will require re-location. Specifically, the MW-17, MW-19 and MW-21 well couplets will require re-location, as depicted on the attached drawing.

We request that the NJDEP review the re-location of these well couplets and agree to the proposed locations. As stated above, site development is anticipated to commence during April 2005 so we respectfully request an expedited NJDEP response.

If you have any questions or require additional information please call our office at (908) 874-0990.

Sincerely,
Environmental Compliance Monitoring, Inc.

Bruce Manganiello
Operations Manager

RECEIVED
MAR - 4 2005

cc: A. Kruczek, Degussa
J. Hodgson, Degussa
A. Yankauskas, ECM
ECM Project File 1085-A2

349 Route 206, Hillsborough, New Jersey 08844
PHONE: 908-874-0990 FAX: 908-874-0920
ecm-inc@att.net
225 South Plank Road, Newburgh, New York 12550
PHONE: 845-566-0990 FAX: 845-566-0880

14

Richard J. Codey
Acting Governor

State of New Jersey

Department of Environmental Protection

Division of Water Quality
P.O. Box 029 Trenton, NJ 08625-0029
Phone: (609) 292-4860
Fax: (609) 984-7938

Bradley M. Campbell
Commissioner

7001 1940 0002 4795 8786
CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dr. John Hodgson, Vice President
Degussa Corporation
PO Box 677
Parsippany, NJ 07054-0677

JUN 22 2005

Re: Surface Water GPA Renewal
Category: BGR -General Remediation Clean-up (GP)
NJPDES Permit No. NJG0102270
Degussa Corporation
Elizabeth City, Union County

Dear Dr. Hodgson:

Enclosed is an Individual NJPDES/DSW General Permit Authorization under the General Remediation Cleanup (BGR) permit which was issued by the Department on April 21, 2005. This General Permit Authorization is issued in accordance with the New Jersey Pollutant Discharge Elimination System (NJPDES) Regulations N.J.A.C. 7:14A-1 et seq. This permit authorizes the discharge of remediated groundwater to surface waters of the state. The Department has prepared this individual authorization to renew your existing permit.

This individual General Permit Authorization allows for the discharge of treated groundwater through the discharge outfall specified on your permit authorization page. Violation of any condition of this authorization may subject the permittee to significant penalties.

The enclosed Authorization to discharge groundwater under the General Permit shall expire on May 31, 2010 or the expiration date of the Individual Authorization Page. Applications for renewal of this Authorization must be submitted to the Department at least 180 days prior to expiration of the Individual Authorization pursuant to N.J.A.C. 7:14A-4.2(e)3.

A copy of the Department's most recently revised Discharge Monitoring Report (DMR) Instruction Manual is available if needed by contacting the Bureau of Point Source Permitting. Please note that if there is a discrepancy between the General Permit Authorization and the DMR Instruction Manual, the General Permit Authorization always takes precedence.

All monitoring shall be conducted in accordance with 1) the Department's "Field Sampling Procedures Manual" applicable at the time of sampling (N.J.A.C. 7:14A-6.5(b)4), and/or 2) the method approved by the Department in Part IV of the permit. The Field Sampling Procedures Manual is available through Maps and Publications Sales Office: Bureau of Revenue, PO Box 417, Trenton, New Jersey 08625, at (609) 777-1038.

If you have questions or comments regarding the final action, please contact Kelly Perez or Brian Salvo at (609) 292-4860.

Sincerely,

Pilar Patterson, Chief
Bureau of Point Source Permitting Region 2

Enclosures

c: Permit Distribution List

Masterfile #: 1212; PI #: 47464

959270556

Table of Contents

This final general permit authorization contains the items listed below:

New Jersey Department of Environmental Protection

Bureau of Point Source Permitting Region 2
Division of Water Quality
PO Box 029
Trenton, NJ 08625-0029
(609) 292-4860

AUTHORIZATION TO DISCHARGE
BGR -General Remediation Clean-up (GP)

Facility Name: DEGUSSA CORP

PI ID #: 47464

Facility Address:
830 MAGNOLIA AVE
Elizabeth, NJ 08872

NJPDES #: NJG0102270

SIC Code: 2851

Type of Activity: Surface Water GPA Renewal

Owner:
LSD LINDEN LLC
447 NORTHFIELD AVE
West Orange, NJ 07052

Operating Entity:
DEGUSSA CORP
PO BOX 677
Parsippany, NJ 07054-0677

Authorization(s) Covered Under This Approval	Issuance Date	Effective Date	Expiration Date
Revocation of Category B	5/25/2005	6/1/2005	N/A
Authorization under BGR	5/25/2005	6/1/2005	5/31/2010

Outfall Number	Latitude	Longitude	Receiving Stream	Classification
DSN002A	40° 39' 52.6"	74° 11' 56.1"	Newark Airport Periphal Ditch via storm sewer	FW2-NT (C2)

Your Request for Authorization under NJPDES General Permit No. NJ0155438 has been approved by the New Jersey Department of Environmental Protection.

Date:

Pilar Patterson, Chief
Bureau of Point Source Permitting Region 2
Division of Water Quality
New Jersey Department of Environmental Protection

NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

The New Jersey Department of Environmental Protection hereby grants you a NJPDES permit for the facility/activity named in this document. This permit is the regulatory mechanism used by the Department to help ensure your discharge will not harm the environment. By complying with the terms and conditions specified, you are assuming an important role in protecting New Jersey's valuable water resources. Your acceptance of this permit is an agreement to conform with all of its provisions when constructing, installing, modifying, or operating any facility for the collection, treatment, or discharge of pollutants to waters of the state. If you have any questions about this document, please feel free to contact the Department representative listed in the permit cover letter. Your cooperation in helping us protect and safeguard our state's environment is appreciated.

Permit Number: NJ0155438

Final: Surface Water Master General Permit

Permittee:
NJPDES Master General Permit Program Interest
Category BGR
Per Individual Notice of Authorization
Division of Water Quality
P.O. Box 029, 401 East State Street
Trenton, NJ 08625

Co-Permittee:

Property Owner:
NJPDES Master General Permit Program Interest
Category BGR
Per Individual Notice of Authorization
Division of Water Quality
P.O. Box 029, 401 East State Street
Trenton, NJ 08625

Location Of Activity:
NJPDES Master General Permit Program Interest
Category BGR
Per Individual Notice of Authorization
Division of Water Quality
P.O. Box 029, 401 East State Street
Trenton, NJ 08625

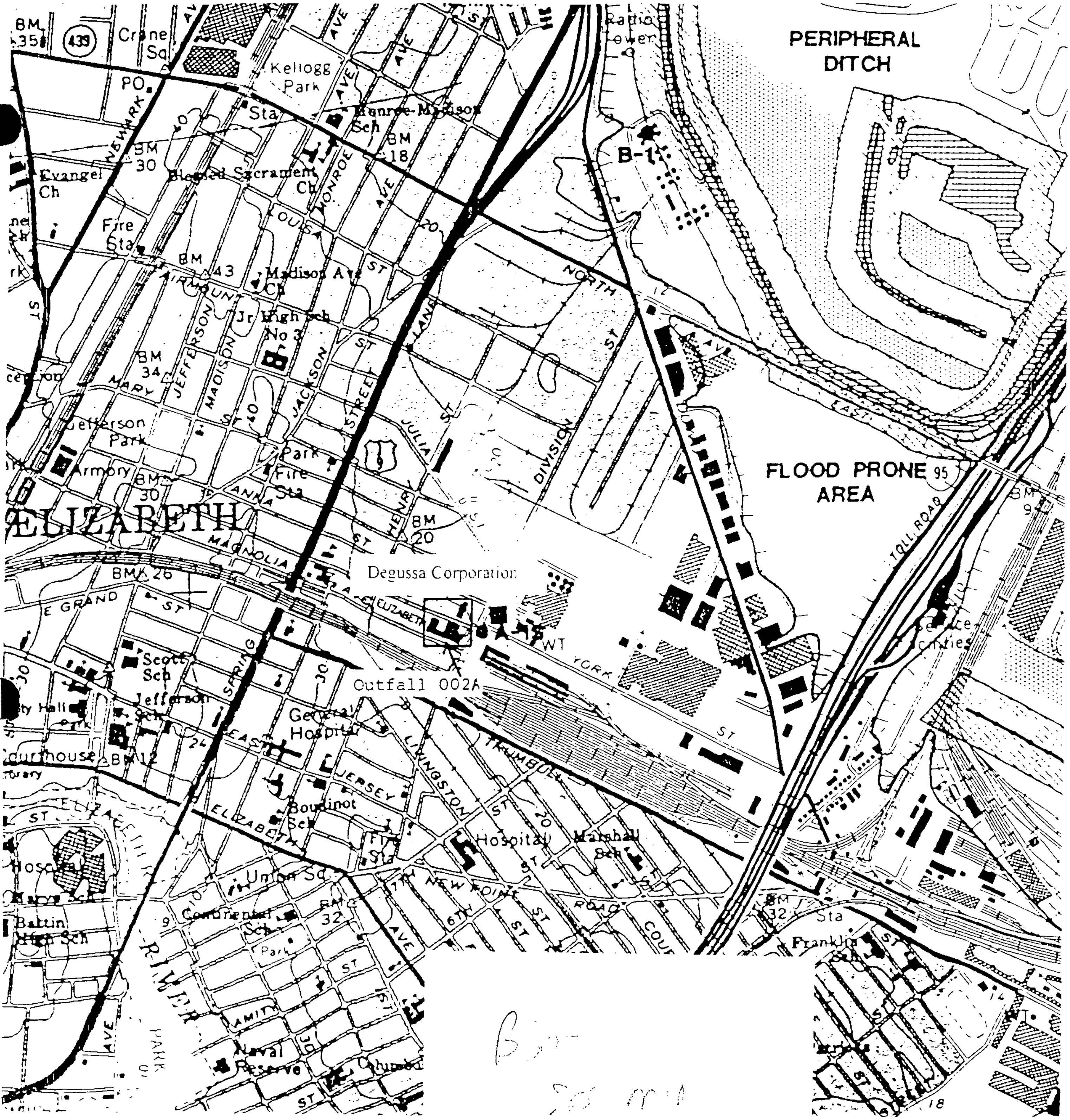
Authorization(s) Covered Under This Approval	Issuance Date	Effective Date	Expiration Date
BGR -General Permit GW Remediation Cleanup	4/20/2005	6/1/2005	5/31/2010
BGR –Typographical Error Correction	5/25/2005	6/1/2005	5/31/2010

By Authority of:
Commissioner's Office

DEP AUTHORIZATION
Pilar Patterson, Chief
Bureau of Point Source Permitting – Region 2
Division of Water Quality

DEP AUTHORIZATION
Howard Tompkins, Chief
Bureau of Point Source Permitting – Region 1
Division of Water Quality

(Terms, conditions and provisions attached hereto)



SOURCES

1. UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL ELIZABETH QUADRANGLE NEW JERSEY (7.5 MINUTE SERIES) 1967, PHOTOREVISED 19[illegible]

2. US DEPT OF INTERIOR FISH AND WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY ELIZABETH NJ 1977.

3. DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT SHEET 26 FLOOD PRONE AREAS OVERLAY 1955

0000
[illegible]4-002

[illegible]ussa Corporation
[illegible] Magnolia Avenue
[illegible]abeth Site

959270560

PART I
GENERAL REQUIREMENTS:
NJPDES

A. General Requirements of all NJPDES Permits

1. Requirements Incorporated by Reference

a. The permittee shall comply with all conditions set forth in this permit and with all the applicable requirements incorporated into this permit by reference. The permittee is required to comply with the regulations, including those cited in paragraphs b. through e. following, which are in effect as of the effective date of the final permit.

b. General Conditions

Penalties for Violations	N.J.A.C. 7:14-8.1 et seq.
Incorporation by Reference	N.J.A.C. 7:14A-2.3
Toxic Pollutants	N.J.A.C. 7:14A-6.2(a)4i
Duty to Comply	N.J.A.C. 7:14A-6.2(a)1 & 4
Duty to Mitigate	N.J.A.C. 7:14A-6.2(a)5 & 11
Inspection and Entry	N.J.A.C. 7:14A-2.11(e)
Enforcement Action	N.J.A.C. 7:14A-2.9
Duty to Reapply	N.J.A.C. 7:14A-4.2(e)3
Signatory Requirements for Applications and Reports	N.J.A.C. 7:14A-4.9
Effect of Permit/Other Laws	N.J.A.C. 7:14A-6.2(a)6 & 7 & 2.9(c)
Severability	N.J.A.C. 7:14A-2.2
Administrative Continuation of Permits	N.J.A.C. 7:14A-2.8
Permit Actions	N.J.A.C. 7:14A-2.7(c)
Reopener Clause	N.J.A.C. 7:14A-6.2(a)10
Permit Duration and Renewal	N.J.A.C. 7:14A-2.7(a) & (b)
Consolidation of Permit Process	N.J.A.C. 7:14A-15.5
Confidentiality	N.J.A.C. 7:14A-18.2 & 2.11(g)
Fee Schedule	N.J.A.C. 7:14A-3.1
Treatment Works Approval	N.J.A.C. 7:14A-22 & 23

c. Operation And Maintenance

Need to Halt or Reduce not a Defense	N.J.A.C. 7:14A-2.9(b)
Proper Operation and Maintenance	N.J.A.C. 7:14A-6.12

d. Monitoring And Records

Monitoring	N.J.A.C. 7:14A-6.5
Recordkeeping	N.J.A.C. 7:14A-6.6
Signatory Requirements for Monitoring Reports	N.J.A.C. 7:14A-6.9

e. Reporting Requirements

Planned Changes	N.J.A.C. 7:14A-6.7
Reporting of Monitoring Results	N.J.A.C. 7:14A-6.8
Noncompliance Reporting	N.J.A.C. 7:14A-6.10 & 6.8(h)
Hotline/Two Hour & Twenty-four Hour Reporting	N.J.A.C. 7:14A-6.10(c) & (d)
Written Reporting	N.J.A.C. 7:14A-6.10(e) &(f) & 6.8(h)
Duty to Provide Information	N.J.A.C. 7:14A-2.11, 6.2(a)14 & 18.1
Schedules of Compliance	N.J.A.C. 7:14A-6.4
Transfer	N.J.A.C. 7:14A-6.2(a)8 & 16.2

PART II

GENERAL REQUIREMENTS: DISCHARGE CATEGORIES

A. Additional Requirements Incorporated By Reference

1. Requirements for Discharges to Surface Waters

a. In addition to conditions in Part I of this permit, the conditions in this section are applicable to activities at the permitted location and are incorporated by reference. The permittee is required to comply with the regulations which are in effect as of the effective date of the final permit.

i. Surface Water Quality Standards N.J.A.C. 7:9B-1

B. General Conditions

1. Scope

a. The issuance of this permit shall not be considered as a waiver of any applicable federal, state, and local rules, regulations and ordinances.

2. Permit Renewal Requirement

a. Permit conditions remain in effect and enforceable until and unless the permit is modified, renewed or revoked by the Department.

b. Submit a complete permit renewal application: 180 days before the Expiration Date.

3. Notification of Non-Compliance

a. The permittee shall notify the Department of all non-compliance when required in accordance with N.J.A.C. 7:14A-6.10 by contacting the DEP HOTLINE at 1-877-WARNDEP (1-877-927-6337).

b. The permittee shall submit a written report as required by N.J.A.C. 7:14A-6.10 within five days.

4. Notification of Changes

a. The permittee shall give written notification to the Department of any planned physical or operational alterations or additions to the permitted facility when the alteration is expected to result in a significant change in the permittee's discharge and/or residuals use or disposal practices including the cessation of discharge in accordance with N.J.A.C. 7:14A-6.7.

b. Prior to any change in ownership, the current permittee shall comply with the requirements of N.J.A.C. 7:14A-16.2, pertaining to the notification of change in ownership.

5. Access to Information

a The permittee shall allow an authorized representative of the Department, upon the presentation of credentials, to enter upon a person's premises, for purposes of inspection, and to access / copy any records that must be kept under the conditions of this permit.

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6. Operator Certification

a. Pursuant to N.J.A.C. 7:10A-1.1 et seq. every wastewater system not exempt pursuant to N.J.A.C. 7:10A-1.1(b) requires a licensed operator. The operator of a system shall meet the Department's requirements pursuant to N.J.A.C. 7:10A-1.1 and any amendments. The name of the proposed operator, where required shall be submitted to the Department at the address below, in order that his/her qualifications may be determined prior to initiating operation of the treatment works.

i. Notifcations shall be submitted to:
NJDEP
Examination and Licensing Unit
P.O. Box 417
Trenton, New Jersey 08625
(609)777-1012

b. The permittee shall notify the Department of any changes in licensed operator within two weeks of the change.

7. Operation Restrictions

a. The operation of a waste treatment or disposal facility shall at no time create: (a) a discharge, except as authorized by the Department in the manner and location specified in Part III of this permit; (b) any discharge to the waters of the state or any standing or ponded condtion for water or waste, except as specifically authorized by a valid NJPDES permit.

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PART III
LIMITS AND MONITORING REQUIREMENTS

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
002A Surface Water Outfall	Newark Airport Peripher. Ditch	FW2-NT(C2)	BGR - General Remediation Clean-up (GP)

Location Description

Effluent sampling shall take place at the exit port of the groundwater treatment system and prior to entering the storm sewer.

Contributing Waste Types

Groundwater Remediation

Surface Water DMR Reporting Requirements:

Submit a Quarterly DMR: within twenty-five days after the end of every quarterly monitoring period beginning from the effective date of the permit (EDP).

Table III - A - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 06/01/2005 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	GPD	*****	*****	*****	*****	1/Quarter	Metered
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6 Daily Minimum	*****	9 Daily Maximum	SU	1/Quarter	Grab
January thru December	QL	***	***		***	***	***			
Solids, Total Suspended	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	40 Daily Maximum	MG/L	1/Quarter	Grab
January thru December	QL	***	***		***	***	***			
IC25 Statre 7day Chr Ceriodaphnia	Effluent Gross Value	*****	*****	*****	61 Report Per Minimum	*****	*****	%EFFL	1/6 Months	Composite
January thru December	QL	***	***		***	***	***			
Oxygen Demand,Chem. (High Level) (COD)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	50 Daily Maximum	MG/L	1/Quarter	Grab
January thru December	QL	***	***		***	***	***			

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Surface Water DMR Reporting Requirements:

Submit a Quarterly DMR: within twenty-five days after the end of every quarterly monitoring period beginning from the effective date of the permit (EDP).

Table III - A - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 06/01/2005 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Arsenic, Total (as As)	Effluent Gross Value	*****	*****	*****	*****	50 Monthly Average	100 Daily Maximum	UG/L	1/Quarter	Grab
January thru December	RQL	***	***		***	8	8			
Mercury, Total (as Hg)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	1 Daily Maximum	UG/L	1/Quarter	Grab
January thru December	RQL	***	***		***	1	1			
Naphthalene	Effluent Gross Value	*****	*****	*****	*****	22 Monthly Average	59 Daily Maximum	UG/L	1/Quarter	Grab
January thru December	QL	***	***		***	***	***			
Bis(2-ethylhexyl) phthalate	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	30 Daily Maximum	UG/L	2/Year	Grab
January thru December	RQL	***	***		***	30	30			
1,2-Dichloroethane	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	3 Report Per Maximum	UG/L	2/Year	Grab
January thru December	RQL	***	***		***	3	3			
Benzene	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	7 Report Per Maximum	UG/L	1/Quarter	Grab
January thru December	RQL	***	***		***	7	7			
Tetrachloroethylene	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	9 Report Per Maximum	UG/L	2/Year	Grab
January thru December	RQL	***	***		***	9	9			

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Surface Water DMR Reporting Requirements:

Submit a Quarterly DMR: within twenty-five days after the end of every quarterly monitoring period beginning from the effective date of the permit (EDP).

Table III - A - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 06/01/2005 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
PCB-1016 (Arochlor 1016)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Report Per Maximum	UG/L	1/Year	Grab
January thru December	QL	***	***		***	***	***			
PCB-1221 (Arochlor 1221)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Report Per Maximum	UG/L	1/Year	Grab
January thru December	QL	***	***		***	***	***			
PCB-1232 (Arochlor 1232)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Report Per Maximum	UG/L	1/Year	Grab
January thru December	QL	***	***		***	***	***			
PCB-1242 (Arochlor 1242)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Report Per Maximum	UG/L	1/Year	Grab
January thru December	QL	***	***		***	***	***			
PCB-1248 (Arochlor 1248)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Report Per Maximum	UG/L	1/Year	Grab
January thru December	QL	***	***		***	***	***			
PCB-1254 (Arochlor 1254)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Report Per Maximum	UG/L	1/Year	Grab
January thru December	QL	***	***		***	***	***			
PCB-1260 (Arochlor 1260)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Report Per Maximum	UG/L	1/Year	Grab
January thru December	QL	***	***		***	***	***			

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PART IV

SPECIFIC REQUIREMENTS: NARRATIVE

General Remediation Clean-up (GP)

A. MONITORING REQUIREMENTS

1. Standard Monitoring Requirements

a. Each analysis required by this permit shall be performed by a New Jersey Certified Laboratory that is certified to perform that analysis.

b. The Permittee shall perform all water/wastewater analyses in accordance with the analytical test procedures specified in 40 CFR 136 unless other test procedures have been approved by the Department in writing or as otherwise specified in the permit.

c. The permittee shall utilize analytical methods that will ensure compliance with the Quantification Levels (QLs) listed in PART III. If the permittee and/or contract laboratory determines that the QLs achieved for any pollutant(s) generally will not be as sensitive as the QLs specified in PART III, the permittee must submit a justification of such to the Bureau of Point Source Permitting. For limited parameters with no QL specified, the sample analysis shall use a detection level at least as sensitive as the effluent limit.

d. All sampling shall be conducted in accordance with the Department's Field Sampling Procedures Manual, or an alternate method approved by the Department in writing.

e. All monitoring shall be conducted as specified in Part III.

f. All sample frequencies expressed in Part III are minimum requirements. Any additional samples taken consistent with the monitoring and reporting requirements contained herein shall be reported on the Monitoring Report Forms.

g. If annual and semi-annual wastewater testing is specified, it shall be conducted in a different quarter of each year so that tests are conducted in each of the four permit quarters of the permit cycle. Testing may be conducted during any month of the permit quarters.

h. The permittee shall perform all residual analyses in accordance with the analytical test procedures specified in 40 CFR 503.8 and the Sludge Quality Assurance Regulations (N.J.A.C. 7:14C) unless other test procedures have been approved by the Department in writing or as otherwise specified in the permit.

i. Flow shall be measured using a meter unless specified otherwise in the individual authorization.

B. RECORDKEEPING

1. Standard Recordkeeping Requirements

a. The permittee shall retain records of all monitoring information, including 1) all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation (if applicable), 2) copies of all reports required by this NJPDES permit, 3) all data used to complete the application for a NJPDES permit, and 4) monitoring information required by the permit related to the permittee's residual use and/or disposal practices, for a period of at least 5 years, or longer as required by N.J.A.C. 7:14A-20, from the date of the sample, measurement, report, application or record.

b. Records of monitoring information shall include 1) the date, locations, and time of sampling or measurements, 2) the individual(s) who performed the sampling or measurements, 3) the date(s) the analyses were performed, 4) the individual(s) who performed the analyses, 5) the analytical techniques or methods used, and 6) the results of such analyses.

C. REPORTING

1. Standard Reporting Requirements

a. The permittee shall submit all required monitoring results to the Department on the forms provided to them. The Monitoring Report Forms (MRFs) may be provided to the permittee in either a paper format or in an electronic file format. Unless otherwise noted, all requirements below pertain to both paper and electronic formats.

b. Any MRFs in paper format shall be submitted to the following addresses:

i. NJDEP
Division of Water Quality
Bureau of Permit Management
P.O. Box 029
Trenton, New Jersey 08625-0029

ii. (if requested by the Water Compliance and Enforcement Bureau)
NJDEP: Northern Bureau of Water Compliance and Enforcement
7 Ridgedale Avenue
Cedar Knolls, New Jersey 07927-1112

iii. (if requested by the Water Compliance and Enforcement Bureau)
NJDEP: Central Bureau of Water Compliance and Enforcement
P.O. Box 407
Trenton, New Jersey 08625-0407

iv. (if requested by the Water Compliance and Enforcement Bureau)
NJDEP: Southern Bureau of Water Compliance and Enforcement
One Port Center
2 Riverside Drive, Suite 201
Camden, New Jersey 08102

c. Any electronic data submission shall be in accordance with the guidelines and provisions outlined in the Department's Electronic Data Interchange (EDI) agreement with the permittee. Paper copies must be available for on-site inspection by DEP personnel or provided to the DEP upon written request.

d. All monitoring report forms shall be certified by the highest ranking official having day-to-day managerial and operational responsibilities for the discharging facility.

e. The highest ranking official may delegate responsibility to certify the monitoring report forms in his or her absence. Authorizations for other individuals to sign shall be made in accordance with N.J.A.C. 7:14A-4.9(b).

f. Monitoring results shall be submitted in accordance with the current Discharge Monitoring Report Manual and any updates thereof.

g. If monitoring for a parameter is not required in a monitoring period, the permittee must report "CODE=N" for that parameter.

h. For intermittent discharges, the permittee shall obtain a sample during at least one of the discharge events occurring during a monitoring period.

i. If there are no discharge events during an entire monitoring period, the permittee must notify the Department when submitting the monitoring results. This is accomplished by placing a check mark in the "No Discharge this monitoring period" box on the paper or electronic version of the monitoring report submittal form.

D. SUBMITTALS

1. Standard Submittal Requirements

a. The permittee shall prepare/update the Operation and Maintenance (O&M) Manual including an emergency plan in accordance with requirements of N.J.A.C. 7:14A-6.12(c).

b. The permittee shall amend the Operation & Maintenance Manual whenever there is a change in the treatment works design, construction, operations or maintenance which substantially changes the treatment works operations and maintenance procedures.

E. FACILITY MANAGEMENT

1. Discharge Requirements

a. The permittee shall discharge at the location(s) specified in PART III of this permit.

b. The permittee shall not discharge foam or cause foaming of the receiving water that: 1) Forms objectionable deposits on the receiving water, 2) Forms floating masses producing a nuisance, or 3) Interferes with a designated use of the waterbody.

c. The permittee's discharge shall not produce objectionable color or odor in the receiving stream.

d. The discharge shall not exhibit a visible sheen.

e. When quantification levels (QL) and effluent limits are both specified for a given parameter in Part III, and the QL is less stringent than the effluent limit, effluent compliance will be determined by comparing the reported value against the QL.

f. The permittee shall attain effluent limits of 10 mg/L as a monthly average and 15 mg/L as a daily maximum for oil & grease. Quarterly, semi-annual or annual monitoring may also be required and shall be specified in Part III.

2. Operation, Maintenance and Emergency conditions

a. The permittee shall operate and maintain treatment works and facilities which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit as specified in the Operation & Maintenance Manual.

b. The permittee shall develop emergency procedures to ensure effective operation of the treatment works under emergency conditions in accordance with NJAC 7:14A-6.12(d).

3. **Chronic Toxicity Testing Requirements**

a. The permittee shall conduct toxicity tests on its wastewater discharge in accordance with the provisions in this section. Such testing will determine if appropriately selected effluent concentrations adversely affect the test species.

b. Chronic toxicity tests shall be conducted using the test species and method identified in Part III of this permit.

c. Any test that does not meet the specifications contained in the Department's "Chronic Toxicity Testing Specifications for Use in the NJPDES Program" document must be repeated within 30 days of the completion of the initial test. The repeat test shall not replace subsequent testing required in Part III.

d. IC25 - Inhibition Concentration - Concentration of effluent which has an inhibitory effect on 25% of the test organisms for the monitored effect, as compared to the control (expressed as percent effluent).

e. Test results shall be expressed as the IC25 for each test endpoint. Where a chronic toxicity testing endpoint yields IC25's from more than one test endpoint, the most sensitive endpoint will be used to evaluate effluent toxicity.

f. The permittee shall submit a Chronic Methodology Questionnaire within 60 days of commencement of discharge or of any change in laboratory.

g. Submit a chronic whole effluent toxicity test report along with your Discharge Monitoring Reports within twenty-five days after the end of every month during which a chronic whole effluent toxicity test was performed. These toxicity tests shall be performed according to the frequency specified in the individual General Permit Authorization. The permittee shall submit toxicity test results on appropriate forms.

h. Test reports shall be submitted to:
New Jersey Department of Environmental Protection
Division of Water Quality, Bureau of Point Source Permitting Region 1
P.O. Box 029
Trenton, New Jersey 08625

4. **Toxicity Reduction Implementation Requirements (TRIR)**

a. The permittee shall initiate a tiered toxicity investigation if two out of six consecutive WET tests demonstrate that the effluent does not comply or will not comply with the toxicity limit specified in Part III of this Permit.

i. If the exceedence of the toxicity limit is directly caused by a documented facility upset, or other unusual event which has been identified and appropriately remedied by the permittee, the toxicity test data collected during the event may be eliminated when determining the need for initiating a TRIR upon written Department approval.

b. The permittee shall begin toxicity characterization within 30 days of the end of the monitoring period when the second toxicity test exceeds the toxicity limits in Part III. The monitoring frequency for toxicity testing shall be increased to semi-monthly (i.e. every two months). Up to 12 additional tests may be required.

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i. The permittee may return to the toxicity testing frequency specified in Part III if four consecutive toxicity tests conducted during the Toxicity Characterization do not exceed the toxicity limit.

ii. If two out of any six consecutive, acceptable tests again exceed the toxicity limit in Part III, the permittee shall repeat Toxicity Reduction Implementation Requirements.

c. The permittee shall initiate a preliminary toxicity identification (PTI) upon the fourth exceedence of the toxicity limit specified in Part III during toxicity characterization.

i. The permittee may return to the monitoring frequency specified in PART III while conducting the PTI. If more frequent WET testing is performed during the PTI, the permittee shall submit all biomonitoring reports to the DEP and report the results for the most sensitive species on the DMR.

ii. As appropriate, the PTI shall include:
(1) treatment plant performance evaluation,
(2) evaluation of chemical use and processes at the facility, and
(3) an evaluation of incidental facility procedures and chemical spill disposal which may contribute to effluent toxicity.

iii. The permittee shall submit a Preliminary Toxicity Identification Notification within 15 months of triggering TRIR. This notification shall include a determination that the permittee intends to demonstrate compliance OR plans to initiate a CTI.

d. The permittee must demonstrate compliance with the WET limitation in four consecutive WET tests to satisfy the requirements of the Toxicity Reduction Investigation Requirements. After successful completion, the permittee may return to the WET monitoring frequency specified in PART III.

e. The permittee shall initiate a Comprehensive Toxicity Investigation (CTI) if the PTI does not identify the cause of toxicity and a demonstration of consistent compliance with the toxicity limit in Part III can not be made.

i. The permittee shall develop a project study plan identifying the party or parties responsible for conducting the comprehensive evaluation, establish a schedule for completing the study, and a description of the technical approach to be utilized.

ii. If the permittee determines that the PTI has failed to demonstrate consistent compliance with the toxicity limit in Part III , a Comprehensive Toxicity Investigation Workplan must be prepared and submitted within 90 days.

iii. The permittee shall summarize the data collected and the actions taken in CTI Quarterly Reports. The reports shall be submitted within 30 calendar days after the end of each quarter.

iv. The permittee shall submit a Final CTI Report 90 calendar days after the last quarterly report. The final CTI report shall include the corrective actions identified to reduce toxicity and a schedule for implementing these corrective actions.

f. Upon receipt of written approval from the Department of the corrective action schedule, the permittee shall implement those corrective actions consistent with that schedule.

i. The permittee shall satisfy the requirements of the Toxicity Reduction Implementation Requirements and return to the original toxicity monitoring frequency after corrective actions are implemented and the permittee demonstrates consistent compliance with the toxicity limit in Part III in four consecutive toxicity tests.

ii. If the implemented corrective measures do not result in consistent compliance with the toxicity limit in Part III, the permittee shall submit a plan for resuming the CTI.

F. CONDITIONS FOR MODIFICATION

1. Notification requirements

a. For new discharges, the permittee shall notify the Department that a tag to mark the location of the outfall pipe has been installed consistent with N.J.A.C. 7:14A-6.2(a)9.

2. Causes for modification

a. The Department may modify or revoke and reissue any permit to incorporate 1) any applicable effluent standard or any effluent limitation, including any effluent standards or effluent limitations to control the discharge of toxic pollutants or pollutant parameters such as acute or chronic whole effluent toxicity and chemical specific toxic parameters, 2) toxicity reduction requirements, or 3) the implementation of a TMDL or watershed management plan adopted in accordance with N.J.A.C. 7:15-7.

b. The permittee may request a minor modification to eliminate the monitoring requirements associated with a discharge authorized by this permit when the discharge ceases due to changes at the facility.

c. For new dischargers where a chronic whole effluent toxicity requirement is imposed: The Department may issue a minor modification further deferring the effective date of the chronic whole effluent toxicity limitation if a facility is implementing the Toxicity Reduction Implementation Requirements (TRIR) in Part IV of this permit.

d. The Department may modify individual authorizations under this permit through a minor modification in accordance with N.J.A.C. 7:14A-16.5(a)1 to reduce WET monitoring to either semi-annual or annual. The criteria for such reduction is consistent compliance with the WET limit for a minimum of ten data points.

e. The Department may modify individual authorizations under this permit through a minor modification in accordance with N.J.A.C. 7:14A-16.5(a)1 to reduce toxics and conventionals monitoring to quarterly or an alternate monitoring frequency. The criteria for such reduction is consistent compliance with the applicable limits for at least 12 data points. The Department may eliminate the total petroleum hydrocarbons or oil and grease monitoring requirement if 12 consecutive data points are non-detectable. This change will be incorporated as a minor modification pursuant to N.J.A.C. 7:14A-16.5.

G. OPERATIONAL ISSUES

1. Operational Requirements

a. The treatment works shall operate at the optimal average design flow rate for maximum groundwater clean-up.

b. No backwash from any treatment unit(s) for maintenance purposes or any other reasons shall be discharged through the authorized outfall(s).

c. The permittee shall not attain any effluent limitations by dilution pursuant to N.J.A.C. 7:14A-6.2. Specifically, the permittee shall not pump from a recovery well and divert such waters to the treatment system for the purposes of diluting groundwater from other contaminated recovery wells.

d. Samples taken in compliance with the specified monitoring requirements shall be taken at the discharge outfall(s) specified in Part III of this permit authorization at the nearest accessible point after final treatment but prior to actual discharge.

2. **Use of Chemical Addition Agents**

a. If a permittee proposes addition of any chemical or biofouling agents in its treatment system in order to enhance treatment effectiveness and system performance, the permittee must obtain permission from the Department in writing prior to use of such compounds.

b. The permittee shall submit a letter to the Department describing the use of such chemical addition agents, including information pertaining to dosage rates and frequency of dosage, and shall also include a material safety data sheet for the product(s).

c. This letter shall be submitted to the appropriate Bureau of Point Source Permitting which issued the individual authorization where the address is included in the cover letter. The Department will then evaluate the submittal and notify the permittee in writing as to whether the compound can be utilized under the conditions of the individual authorization under the permit. Please note that N.J.A.C. 7:14A-22.4(a)7 does not require a treatment works approval (TWA) modification for chemical addition where it is used for purposes of improving treatment system performance.

3. **Third Party Storm Sewers**

a. If the permittee proposes to discharge or discharges through an off-site public or private storm drainage system, please note that this permit to discharge does not exempt, nor shall be construed to exempt, the permittee from compliance with rules, regulations, policies, and/or laws lodged in any agency or subdivision of the state having legal jurisdiction over the storm sewer system proposed for use as a wastewater conveyance.

4. **Permanent Cessation of Discharge to Surface Waters**

a. If the permittee permanently discontinues its discharge to surface waters for 30 days or more the appropriate Regional Bureau of Water and Compliance Enforcement shall be notified:

i. NORTHERN BUREAU (Counties of Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex and Warren) - (973) 656-4099.

ii. CENTRAL BUREAU (Counties of Mercer, Middlesex, Monmouth, Ocean and Union) - (609) 584-4200.

iii. SOUTHERN BUREAU (Counties of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester and Salem) - (609) 968-2640.

5. **Revocation of an Individual Authorization under the Permit.**

a. If the permittee has permanently ceased its discharge to surface water, the permittee can request revocation of its individual authorization under the permit. The permittee can obtain the necessary revocation forms by accessing www.state.nj.us/dep/dwq or by contacting the Department's Bureau of Permit Management at (609) 984-4428. The permittee can also contact the appropriate Regional Enforcement Office for further guidance on closure proceedings.

b. Upon receipt of an administratively complete revocation request, the Department will verify with the appropriate Regional Enforcement Office that the discharge has ceased and that the treatment works has undergone closure, in conformance with N.J.A.C. 7:14A-23.34. The Department will then revoke such individual authorization by preparing a copy of the individual authorization page showing the revocation date of the individual authorization and sending such to the permittee. However, the Department will not revoke an individual authorization if the Site Remediation Program disagrees that revocation is appropriate.

APPENDIX A:

CHRONIC TOXICITY TESTING SPECIFICATIONS

FOR USE IN THE NJPDES PERMIT PROGRAM

Version 2.1

May 1997

TABLE OF CONTENTS

Notice: Mention of trade.names or commercial products do not constitute endorsement or recommendation for use.

I. AUTHORITY AND PURPOSE

These methods specifications for the conduct of whole effluent chronic toxicity testing are established under the authority of the NJPDES permitting program, N.J.A.C. 7:14A-6.5(a)2 and 40 CFR 136, for discharges to waters of the State. The methods referenced herein are included by reference in 40 CFR 136, Table 1.A. and, therefore, constitute approved methods for chronic toxicity testing. The information contained herein serves to clarify testing requirements not sufficiently clarified in those methods documents and also serves to outline and implement the interlaboratory Standard Reference Toxicant Program until a formal laboratory certification program is established under N.J.A.C. 7:18. As such these methods are intended to be used to determine compliance with discharge permits issued under the authority of the NJPDES permit program. Tests are to be conducted in accordance with the general conditions and test organism specific method specifications contained in this document. All other conditions and specifications can be found in 40 CFR 136 and USEPA methodologies.

Until a subchapter on chronic toxicity testing within the regulations governing the certification of laboratories and environmental measurements (N.J.A.C. 7:18) becomes effective, tests shall be conducted in conformance with the methodologies as designated herein and contained in 40 CFR 136. The laboratory performing the testing shall be within the existing acute toxicity testing laboratory certification program established under N.J.A.C. 7:18, as required by N.J.A.C. 7:9B-1.5(c)5.

Testing shall be in conformance with the subchapter on chronic toxicity testing within the N.J.A.C. 7:18 when such regulations become effective. The laboratory performing the toxicity testing shall be within the chronic toxicity testing laboratory certification program to be established under that subchapter, when it becomes effective.

These methods are incorporated into discharge permits as enforceable permit conditions. Each discharge permit will specify in Part IV of the permit, the test species specific methods from this document that will be required under the terms of the discharge permit. Although the test species specific methods for each permit are determined on a case-by-case basis, the purpose of this methods document is to assure consistency among dischargers and to provide certified laboratories with information on the universe of tests to be utilized so that they can make the necessary preparations, including completing the required Standard Reference Toxicant testing. Please note that these methodologies are required for compliance testing only. Facilities and/or laboratories conducting testing under the requirements of a Toxicity Identification Evaluation or for informational purposes are not bound by these methods.

This document constitutes the second version of the NJDEP's interim chronic methodologies. This version contains no significant changes to the test methods themselves. However, in keeping with the Department's continued emphasis on good laboratory practices and quality control, the areas addressing the Standard Reference Toxicant Program, data analysis and data reporting, have been significantly revised.

II. GENERAL CONDITIONS

A. LABORATORY SAFETY, GLASSWARE, ETC.

All safety procedures, glassware cleaning procedures, etc., shall be in conformance with 40 CFR 136 and USEPA's "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms," "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms" and N.J.A.C. 7:18.

B. TEST CONCENTRATIONS / REPLICATES

All testing is to be performed with a minimum of five effluent concentrations plus a dilution water control. A second reference water control is optional when a dilution water other than culture water is used. The use of both a 0.5 or 0.75 dilution factor is acceptable for the selection of test concentrations. If hypothesis testing will be used to determine the test endpoint, one effluent concentration shall be the chronic permit limitation, unless the existing data for the discharge indicate that the NOEC is expected to be significantly less than the permit limit. The use of the 0.5 dilution factor may require more than five dilutions to cover the entire range of effluent concentrations as well as the chronic permit limit, since the permit limit will often not be one of the nominal concentrations in a 0.5 dilution series. In such an instance, the 0.5 dilution series may be altered by including an additional test concentration equal to the permit limit in the dilution series, or by changing the concentration closest to the permit toxicity limit to be equal to that limit. The Department recommends the use of the 0.75 dilution factor using Table 1.0 to determine test concentrations. That table establishes test concentrations based on the chronic toxicity limitation.

For either the 0.5 or 0.75 dilution factor, there shall be at least one test concentration above the permit limitation and at least three test concentrations below the permit limit along with the dilution water control unless the permit limitation prohibits such (e.g., limitations greater than 75% effluent). An effort shall be made to bracket the anticipated test result.

To use Table 1.0, locate the permit limit in column 4. The dilution series becomes the row that corresponds to the permit limit in column 4. For example, a permit limit of 41 would require a dilution series of the dilution water control, 17%, 23%, 31%, 41% and 55% effluent.

The number of replicates used in the test must, at a minimum, satisfy the specifications of the applicable methods contained herein. Increased data sensitivity can be obtained by increasing the number of replicates equally among test concentrations and thus an increased number of replicates is acceptable. Further, the use of nonparametric statistical analysis requires a minimum of four replicates per test concentration. If the data for any particular test is not conducive to parametric analyses and if less than four replicates were included, the test may not be considered acceptable for compliance purposes.

The use of single concentration tests consisting of the permit limitation as a concentration and a control is not permitted for compliance purposes, but may be used by a permittee in the conduct of a Toxicity Investigation Evaluation (TIE) or for information gathering purposes. Such a test would be considered a "pass" if there was no significant difference in test results, using hypothesis testing methods.

Table 1.0: 0.75 DILUTION SERIES INDEXED BY PERMIT LIMIT

				Permit Limit						Permit Limit	
Col #	1	2	3	4	5	**Col #**	1	2	3	4	5
	0.4	0.6	0.8	1	1.3		22	29	38	51	68
	0.8	1.1	`1.5	2	2.7		22	29	39	52	69
	1.3	1.7	2.3	3	4		22	30	40	53	71
	1.7	2.3	3	4	5.3		23	30	41	54	72
	2.1	2.8	3.8	5	6.7		23	31	41	55	73
	2.5	3.4	4.5	6	8		24	32	42	56	75
	3	4	5	7	9		24	32	43	57	76
	3	5	6	8	11		24	33	44	58	77
	4	5	7	9	12		25	33	44	59	79
	4	6	8	10	13		25	34	45	60	80
	5	6	8	11	15		26	34	46	61	81
	5	7	9	12	16		26	35	47	62	83
	5	7	10	13	17		27	35	47	63	84
	6	8	11	14	19		27	36	48	64	85
	6	8	11	15	20		27	37	49	65	87
	7	9	12	16	21		28	37	50	66	88
	7	10	13	17	23		28	38	50	67	89
	8	10	14	18	24		29	38	51	68	91
	8	11	14	19	25		29	39	52	69	92
	8	11	15	20	27		30	39	53	70	93
	9	12	16	21	28		30	40	53	71	95
	9	12	17	22	29		30	41	54	72	96
	10	13	17	23	31		31	41	55	73	97
	10	14	18	24	32		31	42	56	74	99
	11	14	19	25	33		32	42	56	75	100
	11	15	20	26	35	24	32	43	57	76	
	11	15	20	27	36	24	32	43	58	77	
	12	16	21	28	37	25	33	44	59	78	
	12	16	22	29	39	25	33	44	59	79	
	13	17	23	30	40	25	34	45	60	80	
	13	17	23	31	41	26	34	46	61	81	
	14	18	24	32	43	26	35	46	62	82	
	14	19	25	33	44	26	35	47	62	83	
	14	19	26	34	45	27	35	47	63	84	
	15	20	26	35	47	27	36	48	64	85	
	15	20	27	36	48	27	36	48	65	86	
	16	21	28	37	49	28	37	49	65	87	
	16	21	29	38	51	28	37	50	66	88	
	16	22	29	39	52	28	38	50	67	89	
	17	23	30	40	53	28	38	51	68	90	
	17	23	31	41	55	29	38	51	68	91	
	18	24	32	42	56	29	39	52	69	92	
	18	24	32	43	57	29	39	52	70	93	
	19	25	33	44	59	30	40	53	71	94	
	19	25	34	45	60	30	40	53	71	95	
	19	26	35	46	61	30	41	54	72	96	
	20	26	35	47	63	31	41	55	73	97	
	20	27	36	48	64	31	41	55	74	98	
	21	28	37	49	65	31	42	56	74	99	
	21	28	38	50	67	32	42	56	75	100	

* Select the dilution series by finding the row which contains the permit limit in column #4
NOTE: All values are in units of "% effluent" not toxic units

C. DILUTION WATER

1. Marine and Estuarine Waters

A high quality natural water, such as the Manasquan River Inlet is strongly recommended as the dilution water source for chronic toxicity testing with marine and estuarine organisms. The use of the receiving water as the dilution water source is not required. Saline waters prepared with hypersaline brine and deionized water may also be used as dilution water. Hypersaline brines shall be prepared from a high quality natural seawater and shall not exceed a concentration of 100 ppt. The type of a dilution water for a permittee may not be changed without the prior approval of the Department.

The standard test salinity shall be 25 ppt, except for *Champia parvula,* which shall be tested at 30 ppt. Since most effluents are freshwater based, in most cases it will be necessary to adjust the salinity of the test concentrations to the standard test salinity.

2. Fresh Waters

A high quality natural water, such as Round Valley Reservoir (if access is allowed) or Lake Hopatcong, is strongly recommended as the dilution water source for chronic toxicity testing with freshwater organisms. It is not required to perform the toxicity testing with the receiving water as dilution water. Tests performed with a reconstituted water or up to 20% Diluted Mineral Water (DMW) as dilution water is acceptable. For testing with *Ceriodaphnia dubia*, the addition of 5 μg/l selenium (2 μg/l selenium with natural water) and 1 μg/l vitamin B12 is recommended (Keating and Dagbusan, 1984: Keating, 1985 and 1988). The source of a dilution water for a permittee may not be changed without the prior approval of the Department. Reconstituted water and DMW should be prepared with Millipore Super Q^R or equivalent, meet the requirements of N.J.A.C. 7:18-6 and should be aerated a minimum of 24 hrs prior to use, but not supersaturated.

D. EFFLUENT SAMPLE COLLECTION

Effluent samples shall be representative of the discharge being regulated. For each discharge serial number (DSN), the effluent sampling location shall be the same as that specified in the NJPDES permit for other sampling parameters unless an alternate sampling point is specified in the NJPDES discharge permit. For industrial dischargers with a combined process/sanitary waste stream, effluent sampling shall be after chlorination, unless otherwise designated in the permit.

For continuous discharges, effluent sampling shall consist of 24 hour composite samples consisting either of equal volumes taken once every hour or of a flow-proportionate composite sample, unless otherwise approved by the Department. At a minimum, three samples shall be collected as specified above, one every other day. The first sample shall be used for test initiation and the first renewal. The second sample for the next two renewals. The third sample shall be used for the final three renewals. For the *Champia* and *Selenastrum* tests, a single sample shall be collected not more than 24 hours prior to test initiation. No effluent sample shall be over 72 hours old at the time of its use to initiate or renew solutions in a test. It is acceptable to collect samples more frequently for chronic WET testing and if samples are collected daily for acute toxicity testing conducted concurrently, available samples may be used to renew the test solutions as appropriate.

For all other types of discharges, effluent sampling shall be conducted according to specifications contained within the discharge permit, methodology questionnaire or as otherwise specified by the Department. The use of grab samples or other special sampling procedures will be based on time of occurrence and duration of intermittent discharge events.

If a municipal discharger has concerns that the concentrations of ammonia and/or chlorine in an effluent are adequate to cause violations of the permit limit for chronic toxicity testing, the permittee should conduct analyses, as specified in USEPA's toxicity investigation methods documents, to illustrate the relationship between chronic effluent toxicity and chlorine and/or ammonia as applicable. This data may then be submitted to the Department as justification for a request to use modified test procedures, which account for ammonia and/or chlorine toxicity, in future chronic toxicity tests. The Department may, where adequate justification exists, permit the adjustment of these pollutants in the effluent sample if discharge limits for these pollutants are contained in the NJPDES permit and those permit limitations are adequate for the protection of water quality. Any proposed modified test procedures to adjust effluent chlorine and/or ammonia shall be approved by the Department prior to use of those test procedures for any compliance testing.

Except for filtration through a 2 mm or larger screen or an adjustment to the standard test salinity, no other adjustments to the effluent sample shall be made without prior written approval by the Department. Aeration of samples prior to test start shall be minimized where possible and samples shall not be aerated where adequate saturation exists to maintain dissolved oxygen.

E. PHYSICAL CHEMICAL MEASUREMENTS

At a minimum, the physical chemical measurements shall be as follows:

- pH and dissolved oxygen shall be measured at the beginning and end of each 24 hour exposure period, in at least one chamber, of the high, medium and low test concentrations and the control. In order to ensure that measurements for these parameters are representative of the test concentrations during the test, measurements for these parameters should be taken in an additional replicate chamber for such concentrations which contains no test organisms, but is subject to the same test conditions.

- Temperature shall either be monitored continuously, measured daily in at least two locations in the environmental control system, or measured at the beginning of each 24 hr exposure period in at least one replicate for each treatment.

- Salinity shall be measured in all salt water tests at the beginning of each 24 hour exposure period, in at least one replicate for each treatment.

- For all freshwater tests, alkalinity, hardness and conductivity shall be measured in each new sample (100% effluent) and control.

- Nitrite, nitrate and ammonia shall be measured in the control before each renewal in the mysid test only.

- For samples of discharges where concentrations of ammonia and/or chlorine are known or are suspected to be sufficient to cause toxicity, it is recommended that the concentrations of these pollutants be determined and submitted with the standardized report form. The laboratory is advised to consult with the permittee to determine if these parameters should be measured in the effluent. Where such measurements are deemed appropriate, measurements shall be conducted at the beginning of each 24 hour exposure period. Also, since a rise in the test pH can affect the toxicity of ammonia in the effluent, analysis of ammonia during the test may be appropriate if a rise in pH is accompanied by a significant increase in mortality.

F. STATISTICS

The use of both hypothesis testing techniques and point estimate techniques are currently in use by the Department or by permittees for compliance purposes. The NJPDES permit should be checked to determine which type of analysis is required and appropriate for each specific facility. It is not acceptable to simply evaluate any data by "visual data review" unless in the analysis of survival data, no mortality occurred in the test. All data sets must be appropriately statistically evaluated.

For hypothesis testing techniques, statistical analysis shall follow the protocols in USEPA (1988, 1989) to evaluate adverse effects. A significance level of 0.05 shall be utilized to evaluate such effects. Use of a protocol not contained in these documents must be accompanied by a reference and explanation addressing its applicability to the particular data set. Please note the following when evaluating data using hypothesis testing techniques.

Special attention should be given to the omission and inclusion of a given replicate in the analysis of mysid fecundity data (USEPA 1994, p. 275) and *Ceriodaphnia* reproduction data (USEPA 1994, page 174).

Determination of acceptability criteria and average individual dry weight for the growth endpoints must follow the specifications in the applicable documents (e.g., p.84 for saltwater methods document.)

Use of nonparametric statistical analyses requires a minimum of four replicates per test concentration. If the data for any particular test are not conducive to parametric analyses and if less than four replicates were included, the test may not be acceptable to the Department.

Where hypothesis testing is used for compliance purposes, if the results of hypothesis testing indicate that a deviation from the dose response occurs such that two test concentrations are deemed statistically significant from the control but an intermediate test concentration is not, the test is deemed unacceptable and cannot be used for compliance testing purposes.

For point estimate techniques, statistical analysis should follow the protocol contained in "A Linear Interpolation Method for Sublethal Toxicity: The Inhibition Concentration (ICp) Approach (Version 2.0), July 1993, National Effluent Toxicity Assessment Center Technical Report 03-93." Copies of the program can be obtained by contacting the Department. The linear interpolation estimate ICp values and not the bootstrap mean ICp, shall be reported for permit compliance purposes. The ICp value reported on the Discharge Monitoring Report shall be rounded off as specified in the Department's "Discharge Monitoring Report (DMR) Instruction Manual, December 1993." IC25 values shall be reported under the parameter code listed as "NOEC" on the DMR, until the DMR's are adjusted accordingly.

If the result reported by the ICp method is greater than the highest concentration tested, the test result is reported as "greater than C" where "C" is the highest tested concentration. If the ICp is lower than the lowest concentration tested, the test result is reported as "less than C" where "C" is the lowest tested concentration.

If separate NOEC's/IC25's can be calculated from multiple test endpoints, for example a reproductive endpoint and a growth endpoint, the lowest NOEC/IC25 value expressed in units of "% effluent" will be used to determine permit compliance and should, therefore, be reported as the NOEC/IC25 value for the test. If the NOEC value for growth and/or reproduction is not lower than that for survival, the NOEC/IC25 value reported for the test shall be as survival. For saltwater tests, where additional controls are used in a test (i.e. brine and/or artificial sea salt control), a T-test shall be used to determine if there is a significant difference between the original test control and the additional controls. If there is a significant difference between any of the controls, the test may be deemed unacceptable and if so, will not be used for permit compliance.

III. TEST ACCEPTABILITY CRITERIA

Any test that does not meet these acceptability criteria will not be used by the Department for any purpose and must be repeated as soon as practicable, with a freshly collected sample.

1. Tests must be performed by a laboratory approved for the conduct of chronic toxicity tests and certified for acute toxicity testing under N.J.A.C. 7:18.

2. Test results may be rejected due to inappropriate sampling, including the use of less than three effluent samples in a test and/or use of procedures not specified in a permit or methodology questionnaire, use of frozen or unrefrigerated samples or unapproved pretreatment of an effluent sample.

3. Controls shall meet the applicable performance criteria specified in the Table 2.0 and in the individual method specifications contained herein.

4. Acceptable and applicable Standard Reference Toxicant Data must be available for the test.

5. No unapproved deviations from the applicable test methodology may be present.

6. When using hypothesis testing techniques, a deviation from the dose response as explained in the statistical portion of this document shall not be present in the data.

Table 2.0: CONTROL PERFORMANCE

TEST ORGANISM	MINIMUM SURVIVAL	MINIMUM WEIGHT GAIN	MINIMUM FECUNDITY/ REPRODUCTION
Pimephales promelas	80%	0.25 mg avg	N/A
Ceriodaphnia dubia	80%	N/A	Average of ≥15 young per surviving female
Selenastrum capricornutum	Density ≥$2x10^5$cells/ml	N/A	Variability in controls not to exceed 20%.
Cyprinodon variegatus	80%	0.60 mg (unpreserved) avg 0.50 mg (preserved) avg	N/A
Menidia beryllina	80%	0.50 mg (unpreserved) avg 0.43 mg (preserved) avg	N/A
Mysidopsis bahia	80%	0.2 mg per mysid avg	egg production by 50% of control females if fecundity is used as an endpoint.
Champia parvula	100%	N/A	≥10 cystocarps per plant Plants in controls and lower test concentrations shall not fragment so that individual plants cannot be identified.

THE DETERMINATION OF A TEST AS UNACCEPTABLE DOES NOT RELIEVE THE FACILITY FROM MONITORING FOR THAT MONITORING PERIOD

IV. STANDARD REFERENCE TOXICANT TESTING

All chronic testing shall be accompanied by testing with a Standard Reference Toxicant (SRT) as a part of each laboratory's internal quality control program. Such a testing program should be consistent with the quality assurance/quality control protocols described in the USEPA chronic testing manuals. Laboratories may utilize the reference toxicant of their choice and toxicants such as cadmium chloride, potassium chloride, sodium dodecyl sulfate and copper sulfate are all acceptable. However, Potassium chloride has been chosen by several laboratories and is recommended by the Department. The concentration of the reference toxicant shall be verified by chemical analysis in the low and high test concentrations once each year or every 12 tests, whichever is less. It is not necessary to run SRT tests, for all species using the same SRT.

A. INITIAL STANDARD REFERENCE TOXICANT (SRT) TESTING REQUIREMENTS

At a minimum, this testing shall include an initial series of at least five SRT tests for each test species method. Acceptable SRT testing for chronic toxicity shall be performed utilizing the short term chronic toxicity test methods as specified herein. Reference toxicant tests utilizing acute toxicity testing methods, or any method other than those contained in this document are not acceptable. The laboratory should forward results of the initial SRT testing, including control charts, the name of the reference toxicant utilized, the supplier and appropriate chemical analysis of the toxicant to either address listed in the reporting requirements section herein. The initial series of a least five SRT tests for a specific test species method shall be completed and approved in writing by the Department prior to the conduct of any chronic toxicity testing for compliance purposes.

B. SUBSEQUENT SRT TESTING REQUIREMENTS

After receiving the initial approval from the Department to conduct chronic toxicity tests for compliance purposes, subsequent SRT testing shall be conducted as follows:

1. Where organisms used in testing are cultured at the testing laboratory, SRT testing should be conducted once per month for each species/method.

2. Where the laboratory purchases organisms from a laboratory certified in New Jersey for the conduct of acute toxicity testing and approved for the conduct of chronic toxicity testing for the test organism in question (i.e. the "supplier laboratory"), SRT data provided by the "supplier laboratory" for each lot of organisms purchased is acceptable as long as the SRT test result falls within the control limits of the control chart established by the "supplier laboratory" for that organism. The laboratory using purchased organisms is responsible for the results of any compliance tests they perform.

3. A testing laboratory purchasing organisms from a supplier laboratory must still perform SRT testing on a quarterly basis at a minimum, for each species they test with, in order to adequately document their own interlaboratory precision.

4. If a testing laboratory purchasing organisms elects not to use the SRT data from a "supplier laboratory" or such data is unavailable or where organisms are purchased from another organism supplier, the testing laboratory must conduct SRT testing on each lot of organisms purchased.

5. For industrial laboratories certified under N.J.A.C. 7:18 to conduct acute toxicity tests, only the SRT testing conditions specified in 2. through 4. above apply. Where that laboratory/facility cultures their own test organisms, the frequency of SRT testing required will be determined on a case by case basis, based on the frequency of testing for that facility.

NOTE: Based on these requirements, SRT data are considered applicable to a compliance test when the SRT test results are acceptable and the SRT test is conducted within 30 days of the compliance test, for the test species and SRT in question. Therefore, it is not necessary for an approved laboratory to run an SRT test every month if the laboratory is not conducting compliance tests for a particular species.

C. CHANGING OF AN ESTABLISHED REFERENCE TOXICANT

The SRT used for any species by a laboratory may be changed at any time provided that the following conditions have been satisfied:

1. A series of at least three reference toxicant tests are conducted with the new reference toxicant and the results of those tests are identified as satisfactory, in writing, by the Department.

2. Laboratories must continue using the already approved SRT in their ongoing QA/QC program, until such time as the letter referenced above, is received by the laboratory.

D. CONTROL CHARTS

Control charts shall be established from SRT test results in accordance with the procedures outlined in the USEPA methods documents. Control charts shall be constructed using IC25's using the following methods:

1. The upper and lower control limits shall be calculated by determining +/- two standard deviations above and below the mean.

2. SRT test results which exhibit an IC25 that is greater than the highest concentration tested or less than the lowest concentration tested (i.e. a definitive endpoint cannot be determined), shall not be used to establish control charts.

3. SRT tests which do not meet the acceptability criteria for a specific species shall not be used to establish control charts.

4. All values used in the control charts should be as nominal concentrations. However, the control charts shall be accompanied by a chart tabulating the test results as measured concentrations.

5. An outlier (i.e. values which fall outside the upper and lower control limits) should be included on the control chart unless it is determined that the outlier was caused by factors not directly related to the test organisms (e.g., test concentration preparation) as the source of variability would not be directly applicable to effluent tests. In such case, the result and explanation shall be reported to the Department within 30 days of the completion of the SRT test.

The control chart established for the initial series of SRT data submitted will be used by the laboratory and the Department to determine outliers from SRT test results reported in the "NJPDES Biomonitoring Report Form - Chronic Toxicity Test" submitted by the permittees for the test species. These initial control limits will remain unchanged until twenty SRT tests have been completed by the laboratory.

The following procedures shall be used for continually updating control charts after twenty acceptable SRT tests have been completed:

1. Once a laboratory has completed twenty acceptable SRT tests for a test species, the upper and lower control limits shall be recalculated with those twenty values.

2. For each successive SRT test conducted after these first twenty tests, a moving average shall be calculated and the control limits reevaluated using the last twenty consecutive test results.

3. The upper and lower control limits shall be reported on the "NJPDES Biomonitoring Report Form - Chronic Toxicity Tests" along with the SRT test result.

E. UNACCEPTABLE SRT TEST RESULTS

If a laboratory produces any SRT test results which are outside the established upper and lower control limits for a test species at a frequency greater than one test in any ten tests, a report shall be forwarded to the Department at the address contained herein. This report shall include any identified problem which caused the values to fall outside the expected range and the corresponding actions that have been taken by the laboratory. The Department may not accept or may require repeat testing for any toxicity testing that may have been affected by such an occurrence.

If a laboratory produces two consecutive SRT test results or three out of any ten test results which are outside the established upper and lower limits for a specific test species, the laboratory shall be unapproved to conduct chronic toxicity tests for compliance purposes for that test species. Reapproval shall be contingent upon the laboratory producing SRT test results within the established upper and lower control limits for that test species in two consecutive SRT tests. If one or both of those test results again fall outside the established control levels, the laboratory is unapproved for that test species until five consecutive test results within the established upper and lower control limits are submitted and approved by the Department.

F. ANNUAL SUBMITTALS

Control charts shall be forwarded to the Department on an annual basis, on the anniversary of approval for the test species.

The Department may request, at any time, any information which is essential in the evaluation of SRT results and/or compliance data.

V. TEST CANCELLATION / RESCHEDULING EVENTS

A lab may become aware of QA problems during or immediately following a test that will prevent data from being submitted or a lab may be unable to complete a tests due to sample collection or shipping problems. If for any reason a chronic toxicity test is initiated and then prematurely ended by the laboratory or at the request of the permittee, the laboratory shall submit the form entitled "Chronic Whole Effluent Toxicity Testing Test Cancellation / Rescheduling Event Form" contained herein. This form shall be used to detail the reason for prematurely ending the test. This completed form and any applicable raw data sheets shall be submitted to the appropriate biomonitoring program at the address above within 30 days of the cessation of the test.

Tests are considered to be initiated once test organisms have been added to all test chambers.

Submission of this form does not relieve the facility from monitoring for that monitoring period.

VI. REPORTING

The report form entitled "NJPDES Biomonitoring Report Form - Chronic Toxicity Tests" should be used to report the results of all NJPDES chronic compliance biomonitoring tests. Laboratory facsimiles are acceptable but must contain all information included on any recent revisions of the form by the Department. Statistical printouts and raw data sheets for all endpoints analyzed shall be included with the report submitted to the Department. Two copies of all chronic toxicity test report forms shall be submitted to the following address as applicable:

Bureau of Point Source Permitting Region 1 **OR**
Bureau of Point Source Permitting Region 2 (as indicated in the cover letter)

New Jersey Department of Environmental Protection
Division of Water Quality
PO Box 29
Trenton, NJ 08625-0029

It is not necessary to attach a copy of a test report form to the Discharge Monitoring Report (DMR) form when submitting this form to the Department. However, the results of all chronic toxicity tests conducted for compliance purposes must be reported on the DMR form under the appropriate parameter code in the monitoring period in which the test was conducted.

VII. METHOD SPECIFICATIONS

The following method specifications shall be followed as specified in the NJPDES permit. Any changes to these methods will not be considered acceptable unless they are approved in writing by the Department, prior to their use.

A. Fathead Minnow (*Pimephales promelas*), Larval Survival and Growth Test, method 1000.0
B. *Ceriodaphnia dubia*, Survival and Reproduction Test, method 1002.0
C. Algal, (*Selenastrum capricornutum*), Growth Test, method 1003.0
D. Sheepshead Minnow (*Cyprinodon variegatus*), Larval Survival and Growth Test, method 1005.0
E. Inland Silverside (*Menidia beryllina*), Larval Survival and Growth Test, method 1006.0
F. *Mysidopsis bahia*, Survival, Growth, and Fecundity Test, method 1007.0
G. *Champia parvula*, Sexual Reproduction Test, method 1009.0

VIII. REFERENCES

1. Keating, K. 1985. The influence of Vitamin B12 deficiency on the reproduction of Daphnia pulex Leydig (Cladocera). J. Crustacean Biology 5:130-136.

2. Keating, K. 1988. N.J.D.E.P. Project C29589, Fiscal 1988 Third Quarter Summary Report. Producing Nutritionally Competent Daphnids for Use in Bioassay. 44p.

3. Keating, K., and B. Dagbusan. 1984. Effect of selenium deficiency on cuticle integrity in Cladocera (Crustacea). Proc. Natl. Acad. Sci. USA 81:3433-3437.

4. NJDEP, 1993. Discharge Monitoring Report (DMR) Instruction Manual.

5. USEPA. 1994. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. EPA-600/4-91-003. July 1994. Second Edition.

6. USEPA. 1994. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA/600/4-91/002. July 1994. Third Edition.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PO Box 29
TRENTON, NEW JERSEY 08625-0029
BIOMONITORING PROGRAM

CHRONIC WHOLE EFFLUENT TOXICITY TESTING
TEST CANCELLATION / RESCHEDULING EVENT FORM

THIS FORM IS TO BE COMPLETED AND SUBMITTED TO THE DEPARTMENT DIRECTLY BY THE LABORATORY CONDUCTING CHRONIC TOXICITY TESTS WHENEVER A CHRONIC TOXICITY TEST IS PREMATURELY ENDED FOR ANY REASON

NJPDES No.: ____________________

FACILITY NAME: ____________________

LOCATION: ____________________

CONTACT: ____________________ PHONE: ____________________

CANCELLATION EVENT:

LABORATORY NAME / NUMBER: ____________________

CONTACT: ____________________

TEST START DATE: ____/____/____ TEST END DATE: ____/____/____

REASON FOR CANCELLATION: ____________________

____

____

____

____

____

EFFLUENT SAMPLING:

SAMPLING POINT / DESCRIPTION OF SAMPLING SITE: ____________________

____

SAMPLING INITIATED: DATE: ___/___/___ TIME: __________

SAMPLING ENDED: DATE: ___/___/___ TIME: __________

NUMBER OF EFFLUENT SAMPLES COLLECTED: __________

SAMPLE TYPE (GRAB/COMPOSITE): __________

RECEIVED IN LAB BY/FROM: ____________________

____

METHOD OF SHIPMENT: ____________________

(ALL APPLICABLE RAW DATA SHEETS MUST BE ATTACHED)

c: Permittees authorized agent.

State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

Division of Water Quality
CN 029 Trenton, NJ 08625-0029
FAX: (609) 984-7938

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

MAR 17 2000

Andrew E. Kruczek, Manager, Env., Services
Creanova, Inc.
P.O. Box 365
Piscataway, NJ 08855

Dear Mr. Kruczek:

Re: NJPDES/DSW Permit No. NJ0102270
Creanova Inc.
Elizabeth Township, Union County

Enclosed is the final NJPDES/DSW permit renewal, to discharge pollutants to the Newark Airport peripheral ditch via a local storm sewer, issued in accordance with the New Jersey Pollutant Discharge Elimination System (NJPDES) Regulations, N.J.A.C. 7:14A-1 et seq. The facility has been classified as a minor facility by the New Jersey Department of Environmental Protection (the Department). Violation of any condition of this NJPDES permit may subject the permittee to significant penalties.

The comments received on the draft permit renewal and the Department's responses are enclosed.

The Department's current Discharge Monitoring Report (DMR) Instruction Manual for renewals is available, if needed, by contacting the Bureau of Point Source Permitting Region 2 at (609)292-4860. Please note that if there is a discrepancy between the NJPDES permit and the DMR Instruction Manual, the NJPDES permit always takes precedence.

All monitoring shall be conducted in accordance with the Department's current Field Sampling Procedures Manual, which is available from the Maps and Publications Sales Office, Bureau of Revenue, P.O. Box 417, Trenton, New Jersey 08625, (609)777-1038.

The permittee, or any interested party pursuant to N.J.A.C. 7:14A-17.2(a), may submit a written request for an adjudicatory hearing within 30 calendar days following the receipt of this final NJPDES permit to contest the conditions of the permit. Any reasonably ascertainable issues must have been raised during the public comment period, pursuant to N.J.A.C. 7:14A-17.3. The requirements for requesting an adjudicatory hearing can be found in N.J.A.C. 7:14A-17.2. The enclosed Adjudicatory Hearing Request Checklist and Tracking Form for Permits must be completed and a copy of the completed form, along with the information required by Part III of that form, including attachments, must be submitted to each party listed on the form. If a STAY of contested conditions is requested pursuant to N.J.A.C. 7:14A-17.6, a copy of the STAY request and supporting documentation shall be sent to the parties listed on the Adjudicatory Hearing Request Checklist and Tracking Form for Permits and to John Covino, DAG, Asst. Section Chief, Environmental Permitting and Counseling Section, Division of Law, Hughes Justice Complex, P.O. Box 93, Trenton, NJ 08625.

An application for renewal of this NJPDES permit must be submitted at least 180 days prior to expiration of the permit pursuant to N.J.A.C. 7:14A-4.2(e)3. Please note that as specified at N.J.A.C. 7:14A-4.4(b)3ii(1), this facility shall submit the results from a minimum of at least one acute and one chronic whole effluent toxicity test performed on the same sample(s) as part of the renewal application.

Should you have any questions regarding this action, please contact Ramanathan Asokan of my staff at (609) 292-4860.

Sincerely,

Debra Hammond

Debra Hammond, Chief
Bureau of Point Source Permitting Region 2
Division of Water Quality

WFM399:ra

Enclosures

c: Final Permit Distribution List

ECM

environmental compliance monitoring inc.

September 14, 2005

Mr. Michael Buriani
Case Manager
New Jersey Department of Environmental Protection
Responsible Party Remediation Element
Bureau of Northern Case Management
401 East State Street, 5th Floor
P.O. Box 432
Trenton, New Jersey 08625-0432

SEP 1 6 2005

RE: **Request for NJDEP Meeting**
Degussa Corporation (formerly Nuodex Inc.)
Elizabeth, New Jersey
ISRA Case No. 85374
ECM Project # 1135

Dear Mr. Buriani:

Per your telephone discussion with Alex Yankaskas on September 8, 2005, Environmental Compliance Monitoring, Inc. (ECM) is respectfully requesting a meeting between representatives of the New Jersey Department of Environmental Protection (NJDEP) and Degussa Corporation (Degussa). The purpose of the meeting is to review the specific requirements requested by the NJDEP in their technical review letter dated July 12, 2005 relative to delineation efforts and site limitations and to finalize delineation requirements and locations. As you had requested, the specific items that warrant discussion during the site meeting are briefly outlined below.

The NJDEP letter (Item 7) requested a proposal to delineate the downgradient extent of each contaminant that exceeds the NJDEP ground water quality standard (GWQS) to the east/southeast of MW-10D, MW-13D and MW-22D and south of MW-1D and MW-1DD.

Relative to the constituents reported in these wells and their location, ECM presents the following issues relative to the delineation effort. The monitoring well locations are presented on Figure 1. The analytical results for these monitoring wells are summarized on Tables 1 through 5.

MONITORING WELL MW-10D

Benzene and select metals (specifically, cadmium, lead and mercury) have been reported above the NJDEP–GWQS in MW-10D.

Review of the benzene level in this well indicates a decreasing trend during the previous three monitoring events (Table 1) from a reported level of 49 microgram per liter (µg/l) to 9.1 µg/l.

Review of the reported metal levels (cadmium, lead and mercury) indicates a fluctuating and/or a decreasing trend in MW-10D. The MW-10D sample collected during the May 2005 sample event reported these metals as not detected or below the GWQS.

Based on the decreasing trend for benzene and the metals reported below the GWQS, it is proposed to monitor MW-10D during subsequent monitoring events concurrent with the anticipated re-activation and active pumping from deep well recovery network and evaluate the reported results.

349 Route 206, Hillsborough, New Jersey 08844
PHONE: 908-874-0990 FAX: 908-874-0920
ecm-inc.@att.net
4787 Merlot Drive, Viera, Florida 32955
PHONE: 321-636-5010 FAX: 321-636-5010

Relative to delineation, we have attempted to locate a delineation point east and southeast of MW-10D on the adjacent property; however, overhead utilities and neighboring facility structures precludes a delineation location. Additionally, assessment of the property further east consists of multiple overhead electrical lines, various underground utilities and a building prior to Division Street which is approximately 200-feet east of MW-10D. Delineation on or near Division Street would not be representative of the ground water quality downgradient of MW-10D.

<u>MONITORING WELL MW-13D</u>

Benzene, cadmium and lead have been reported above the NJDEP–GWQS in MW-13D (Table 2).

The benzene level has decreased significantly from 280 µg/l during December 2004 to 4.1 µg/l during the most recent monitoring event during May 2005.

Review of the cadmium and lead reported in this well indicated levels below the GWQS for lead (3.8 µg/l) and cadmium reported at 4.7 µg/l marginally above the GWQS of 4.0 µg/l.

Based on the decreasing benzene, cadmium and lead levels, it is proposed to monitor MW-13D during subsequent monitoring events for trends in the data combined with the anticipated active pumping from the deep recovery well network.

Similar to MW-10D, we have attempted to select a suitable delineation point east of MW-13D; however, the area east of MW-13D is severely restricted by impacts from the neighboring facility operations and further east by overhead electrical lines, various underground utilities and facility structures. The nearest delineation location would be located on or near Division Street, which would not be an appropriate due to the extended distance from the well.

<u>MONITORING WELL MW-22D</u>

Benzene has been reported above the NJDEP-GWQS in MW-22D (Table 3).

The operation of the ground water recovery and treatment system is designed to effectively control and recover impacted ground water in this area.

Attempts to select an appropriate delineation point east of MW-22D have been precluded by a building located on the immediately adjacent neighboring property. Alternate locations are limited and need to be evaluated on-site with the NJDEP.

<u>MONITORING WELL MW-1D</u>

Benzene, chlorobenzene, lead and mercury have been reported above the NJDEP-GWQS in MW-1D (Table 4).

The reported benzene and chlorbenzene levels in MW-1D have fluctuated from inception of ground water recovery from the deep zone (Table 4). During initial operation these levels were elevated in MW-1D, which is typical of pumping influence from the near recovery well (RW1-45). Levels of these compounds have fluctuated in these wells since suspension of the recovery well.

Relative to metals reported in MW-1D, levels of lead and mercury have fluctuated; however, the reported levels have been marginally above the NJDEP-GWQS.

We have attempted to select an appropriate delineation location south of MW-1D; however, access is severely restricted by an elevated retaining wall within seven feet of the well followed by four feet to the property line. Off-site delineation is prohibitive by the railroad, which extends at least 40 feet across multiple railroad tracks. Alternate locations are limited and need to be evaluated on-site with the NJDEP.

MONITORING WELL MW-1DD

Cadmium, lead and mercury have been reported above the NJDEP-GWQS in MW-1DD (Table 5).

The reported metal levels in MW-1DD have generally decreased during the monitoring program. During the May 2005 monitoring event, mercury was the only metal reported above the GWQS at 2.5 μg/l, slightly above the GWQS of 2.0 μg/l.

Based on the decreasing trend for metals reported in MW-1DD, delineation requirements will be discussed during the site meeting.

Based on your recent telephone discussion with our office, we respectfully request that the NJDEP review the above information and meet with us on-site to assess our concerns relative to delineation efforts. Additionally, during our site meeting we would like to discuss the potential for the current site owner to proceed with site development plans.

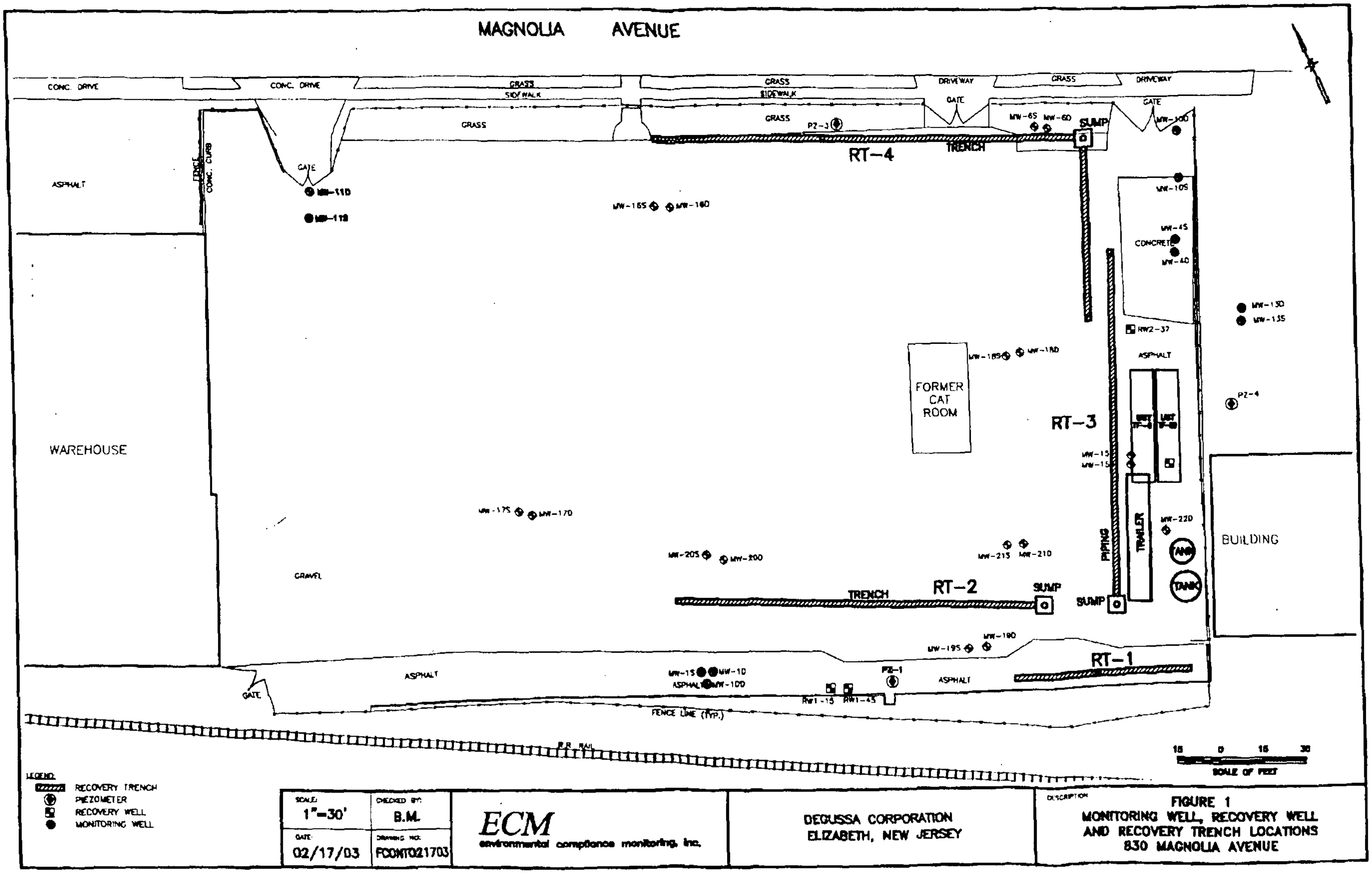
Your continued time and attention to this project is appreciated. If you have any questions pertaining to this request, or other matters, please do not hesitate to contact our office.

Sincerely,

Environmental Compliance Monitoring, Inc.

Bruce Manganiello
Operations Manager

cc: A. Kruczek, Degussa
A. Yankaskas, ECM
ECM File 1085-A2



MAGNOLIA AVENUE
CONC. DRIVE
CONC. DRIVE
GRASS
SIDEWALK
GRASS
SIDEWALK
DRIVEWAY
GRASS
DRIVEWAY
GATE
GATE
GRASS
GRASS
PZ-3
MW-6S
MW-6D
SUMP
MW-10D
RT-4
TRENCH
ASPHALT
FENCE
CONC. CURB
GATE
MW-11D
MW-11S
MW-16S
MW-16D
MW-10S
MW-4S
CONCRETE
MW-4D
MW-13D
MW-13S
RW2-3?
ASPHALT
MW-18S
MW-18D
FORMER CAT ROOM
WAREHOUSE
RT-3
PZ-4
MW-1S
MW-1S
MW-17S
MW-17D
TRAILER
PIPING
MW-22D
TANK
TANK
BUILDING
MW-20S
MW-20D
MW-21S
MW-21D
GRAVEL
TRENCH
RT-2
SUMP
SUMP
MW-19S
MW-19D
RT-1
MW-1S
MW-1D
ASPHALT
MW-10D
PZ-1
ASPHALT
ASPHALT
GATE
RW1-1S
RW1-4S
FENCE LINE (TYP.)
R.R. RAIL
15 0 15 30
SCALE OF FEET
LEGEND:
RECOVERY TRENCH
PIEZOMETER
RECOVERY WELL
MONITORING WELL
SCALE: 1"=30'
CHECKED BY: B.M.
DATE: 02/17/03
DRAWING NO.: FCONT021703
ECM
environmental compliance monitoring, inc.
DEGUSSA CORPORATION
ELIZABETH, NEW JERSEY
DESCRIPTION
FIGURE 1
MONITORING WELL, RECOVERY WELL AND RECOVERY TRENCH LOCATIONS
830 MAGNOLIA AVENUE

TABLE 1
MW-10D ANALYTICAL HITS SUMMARY FOR GROUND WATER SAMPLES – APRIL 2001 THROUGH MAY 2005
830 MAGNOLIA AVENUE – DEGUSSA CORPORATION – ELIZABETH, NJ

MW-10D									
Sample Date Laboratory Identification	4/25/01 271012	5/13/02 350143	12/11/02 397484	6/10/03 434705	12/1/03 484503	6/8/04 536607	12/6/04 591581	5/24/05 636028	GWQS (µg/L)
VOLATILE ORGANICS									
Chloromethane	ND	ND	ND	ND	ND	1.6	ND	ND	30
Vinyl Chloride	ND	4.7	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethene	ND	0.9	ND	ND	ND	ND	ND	ND	2
1,1-Dichloroethane	ND	3.3	ND	ND	ND	ND	ND	ND	50
Cis-1,2-Dichloroethene	0.3	18	2.2	0.8	ND	ND	0.7	ND	70
Trichloroethene	ND	***2.3***	1.0	ND	ND	ND	ND	ND	1
Benzene	***53***	***11***	***16***	***47***	***4.0***	***49***	***23***	***9.1***	1
Toluene	0.3	0.5	ND	ND	ND	ND	ND	ND	1,000
Chlorobenzene	15	3.8	6.3	13	1.7	18	17	5.8	50
Volatile Organic TICs	***756***	123	74	123	46	221	59	50	500*
BASE NEUTRALS									
Diethylphthalate	ND	0.5	NT	NT	NT	NT	NT	NT	5,000
Base Neutral TICs	***886***	348	NT	NT	NT	NT	NT	NT	500*
METALS									
Antimony	ND	ND	18	ND	ND	16.3	4.6	6.9	20
Arsenic	ND	ND	***12.1***	ND	ND	4.6	ND	ND	8
Beryllium	ND	ND	0.13	ND	ND	ND	0.17	ND	20
Cadmium	***22.3***	2.0	***60.4***	ND	3.8	***56.3***	***42.8***	2.0	4
Chromium	4.7	3.2	45.5	ND	4.4	47.4	22.8	4.8	100
Copper	145	14.0	275	3.5	21.1	281	177	4.9	1,000
Lead	***44.1***	3.2	***335***	ND	***18.3***	***264***	***130***	ND	10
Mercury	***17.1***	0.78	***39.2***	0.16	***2.2***	***45.0***	***24.2***	0.20	2
Nickel	37.5	16.4	***113***	11.7	18.0	***112***	73.8	14.9	100
Silver	1.5	ND	5.9	ND	ND	4.8	1.1	1.8	30
Zinc	287	110	2,840	35.8	142	2,100	1,270	37.8	5,000

All results reported in micrograms per liter (µg/L).

GWQS :Ground Water Quality Standard represents the higher of NJDEP Ground Water Quality Criteria and Practical Quantitation Levels for listed compound.

-- : No criteria listed for this compound.

NT : Not Tested.

TICs :Tentatively Identified Compounds; the listed GWQS is relative to the interim generic criteria for synthetic organic compounds lacking carcinogenic evidence (maximum total concentration).

ND : Compound Not Detected above laboratory method detection limit and associated criteria.

BOLD : Concentration reported above the listed GWQS.

TABLE 2

MW-13D ANALYTICAL HITS SUMMARY FOR GROUND WATER SAMPLES – APRIL 2001 THROUGH MAY 2005

830 MAGNOLIA AVENUE – DEGUSSA CORPORATION – ELIZABETH, NJ

MW-13D									
Sample Date Laboratory Identification	4/26/01 271022	5/13/02 350144	12/12/02 397485	6/11/03 434708	12/2/03 484505	6/8/04 536609	12/6/04 591583	5/24/05 636034	GWQS (µg/L)
VOLATILE ORGANICS									
Vinyl Chloride	ND	ND	2.7	ND	ND	ND	ND	ND	5
Methylene Chloride	ND	ND	ND	ND	ND	0.9	ND	ND	3
1,1-Dichloroethane	ND	ND	1.1	ND	ND	ND	ND	ND	50
Trans-1,2-Dichloroethene	0.6	0.7	0.4	ND	ND	0.3	ND	ND	100
Cis-1,2-Dichloroethene	0.9	0.5	1.3	ND	ND	ND	ND	ND	70
Benzene	***8.5***	***1.2***	***15***	0.7	***9.0***	***34***	***280***	***4.1***	1
Toluene	ND	ND	ND	ND	0.8	0.3	ND	ND	1,000
Chlorobenzene	29	27	38	5.7	15	***51***	***300***	12	50
Volatile Organic TICs	221	142	190	24	50	91	50	0	500*
BASE NEUTRALS									
1,4-Dichlorobenzene	2.2	0.9	NT	NT	NT	NT	NT	NT	75
1,2-Dichlorobenzene	3.0	ND	NT	NT	NT	NT	NT	NT	600
Base Neutral TICs	303	270	NT	NT	NT	NT	NT	NT	500*
METALS									
Cadmium	***22.9***	***11.1***	1.1	ND	1.5	***14.8***	0.83	***4.7***	4
Chromium	3.1	15.4	10.2	ND	12.5	38.0	5.8	9.1	100
Copper	114	46.8	15.5	ND	12.2	64.1	24.3	33.9	1,000
Lead	***13.0***	6.4	3.9	ND	3.1	***15.0***	ND	3.8	10
Mercury	0.18	0.24	ND	ND	ND	0.37	ND	ND	2
Nickel	24.3	38.8	49.5	29.2	51.0	69.4	36.5	38.9	100
Silver	1.3	ND	ND	ND	ND	2.9	ND	ND	30
Zinc	197	104	25.7	7.8	24.4	97.3	27.6	32.9	5,000

All results reported in micrograms per liter (µg/L).

GWQS :Ground Water Quality Standard represents the higher of NJDEP Ground Water Quality Criteria and Practical Quantitation Levels for listed compound.

-- : No criteria listed for this compound.

NT : Not Tested.

TICs :Tentatively Identified Compounds; the listed GWQS is relative to the interim generic criteria for synthetic organic compounds lacking carcinogenic evidence (maximum total concentration).

ND : Compound Not Detected above laboratory method detection limit and associated criteria.

BOLD : Concentration reported above the listed GWQS.

TABLE 3
MW-22D ANALYTICAL HITS SUMMARY FOR GROUND WATER SAMPLES – JUNE 2003 THROUGH MAY 2005
830 MAGNOLIA AVENUE – DEGUSSA CORPORATION – ELIZABETH, NJ

MW-22D					
Sample Date Laboratory Identification	6/13/03 435845	8/16/04 555380	12/7/04 591587	5/24/05 636035	GWQS (µg/L)
VOLATILE ORGANICS					
1,2-Dichloroethane	NA	ND	0.9	ND	2
Benzene	NA	***47***	***79***	***60***	1
Toluene	NA	ND	2.6	7.1	1,000
Ethylbenzene	NA	ND	1.5	1.0	700
Total Xylenes	NA	ND	4.6	1.4	1,000
Volatile Organic TICs	NA	ND	***652***	432	500*

All results reported in micrograms per liter (µg/L).

GWQS :Ground Water Quality Standard represents the higher of NJDEP Ground Water Quality Criteria and Practical Quantitation Levels for listed compound.

-- : No criteria listed for this compound.

NT : Not Tested.

TICs :Tentatively Identified Compounds; the listed GWQS is relative to the interim generic criteria for synthetic organic compounds lacking carcinogenic evidence (maximum total concentration).

ND : Compound Not Detected above laboratory method detection limit and associated criteria.

BOLD : Concentration reported above the listed GWQS.

TABLE 4

MW-1D ANALYTICAL HITS SUMMARY FOR GROUND WATER SAMPLES – APRIL 2001 THROUGH MAY 2005

830 MAGNOLIA AVENUE – DEGUSSA CORPORATION – ELIZABETH, NJ

MW-1D									
Sample Date Laboratory Identification	4/23/01 270366	5/10/02 349594	12/10/02 397478	6/12/03 434714	12/2/03 484507	6/9/04 536613	12/7/04 591585	5/25/05 636838	GWQS (µg/L)
VOLATILE ORGANICS									
Methylene Chloride	ND	ND	ND	ND	1.0	ND	ND	ND	3
Benzene	***120***	***3,700***	***600***	***85***	***100***	***5.2***	***28***	***16***	1
Toluene	ND	ND	ND	ND	0.9	ND	0.7	ND	1,000
Chlorobenzene	12	***100***	***120***	36	***160***	***53***	***190***	***120***	50
Ethylbenzene	ND	ND	ND	ND	1.0	ND	1.5	ND	700
Volatile Organic TICs	0.0	0.0	0.0	4.4	118	12	93	121	500*
BASE NEUTRALS									
Naphthalene	ND	0.8	NT	NT	NT	NT	NT	NT	300
Base Neutral TICs	58	425	NT	NT	NT	NT	NT	NT	500*
METALS									
Cadmium	***5.0***	0.52	NT	3.8	NT	2.8	NT	3.7	4
Chromium	ND	4.3	NT	5.9	NT	3.9	NT	7.1	100
Copper	23.9	8.7	NT	9.9	NT	18.8	NT	33.8	1,000
Lead	***30.3***	3.5	NT	7.0	NT	5.2	NT	***11.9***	10
Mercury	***9.5***	***2.6***	NT	***3.0***	NT	***2.6***	NT	***6.3***	2
Nickel	6.8	9.3	NT	4.9	NT	6.3	NT	10.8	100
Zinc	48.1	39.5	NT	36.0	NT	48.3	NT	52.1	5,000

All results reported in micrograms per liter (µg/L).

GWQS :Ground Water Quality Standard represents the higher of NJDEP Ground Water Quality Criteria and Practical Quantitation Levels for listed compound.

-- : No criteria listed for this compound.

NT : Not Tested.

TICs :Tentatively Identified Compounds; the listed GWQS is relative to the interim generic criteria for synthetic organic compounds lacking carcinogenic evidence (maximum total concentration).

ND : Compound Not Detected above laboratory method detection limit and associated criteria.

BOLD : Concentration reported above the listed GWQS.

TABLE 5
MW-1DD ANALYTICAL HITS SUMMARY FOR GROUND WATER SAMPLES – APRIL 2001 THROUGH MAY 2005
830 MAGNOLIA AVENUE – DEGUSSA CORPORATION – ELIZABETH, NJ

MW-1DD						
Sample Date Laboratory Identification	4/23/01 270367	5/10/02 349595	6/12/03 434716/5	6/9/04 536614	5/25/05 636839	GWQS (µg/L)
VOLATILE ORGANICS						
Benzene	0.4	***1.9***	0.9	0.9	ND	1
Toluene	ND	0.3	ND	ND	ND	1,000
Chlorobenzene	ND	0.4	0.5	ND	ND	50
Volatile Organic TICs	3.3	0.0	0.0	0.0	0.0	500*
BASE NEUTRALS						
Fluoranthene	0.5	ND	NT	NT	NT	300
Pyrene	0.4	ND	NT	NT	NT	200
Base Neutral TICs	215	150	NT	NT	NT	500*
METALS						
Arsenic	3.8	ND	ND	ND	ND	8
Cadmium	***17.2***	***6.7***	1.7	***5.3***	1.9	4
Chromium	ND	6.5	2.9	2.0	4.5	100
Copper	81.2	31.0	10.2	17.9	10.3	1,000
Lead	***36.7***	***19.8***	4.0	***11.4***	5.2	10
Mercury	***68.0***	***20.0***	***4.6***	***7.5***	***2.5***	2
Nickel	18.6	11.6	3.9	5.0	5.4	100
Zinc	107	170	40.5	31.6	14.5	5,000

All results reported in micrograms per liter (µg/L).

GWQS :Ground Water Quality Standard represents the higher of NJDEP Ground Water Quality Criteria and Practical Quantitation Levels for listed compound.

-- : No criteria listed for this compound.

NT : Not Tested.

TICs :Tentatively Identified Compounds; the listed GWQS is relative to the interim generic criteria for synthetic organic compounds lacking carcinogenic evidence (maximum total concentration).

ND : Compound Not Detected above laboratory method detection limit and associated criteria.

BOLD : Concentration reported above the listed GWQS.

State of New Jersey
Department of Environmental Protection

Richard J. Codey
Acting Governor

Bradley M. Campbell
Commissioner

JUL 12 2005

Andrew Kruczek
Degussa Corporation
379 Interpace Parkway
P.O. Box 677
Parsippany, NJ 07054-0677

RE: Administrative Consent Order (ACO) in the Matter of **Nuodex, Inc.**
Remediation Agreement (RA) Amendment in the Matter of The Elizabeth Site
Creanova, Inc.
Elizabeth City, Union County
ISRA Case #85374

Dear Mr. Kruczek:

The New Jersey Department of Environmental Protection (NJDEP) has completed a technical review of the progress report dated April 8, 2005 and the site redevelopment plans dated June 10, 2005. The following comments will serve as the NJDEP's response, based on that review. Creanova shall submit all information required below within 30 calendar days of receipt of this letter.

1. The proposed hydropunch sampling locations at the 833 Magnolia Avenue portion of the site are acceptable; however, the NJDEP will not issue an approval until Creanova submits the information required in Item 7 below.

The NJDEP recommends that Creanova install permanent monitoring wells. If Creanova chooses not to install permanent wells at this time, Creanova shall be aware that permanent wells may be required in this area of the site in the future.

2. Creanova has stated that the metals in the ground water are due to the historic fill material at the site. Although there is historic fill material at the site, at least some of the metals in ground water are the result of Creanova's operations. Therefore, Creanova shall propose to analyze HP-1 through HP-5 for metals.

3. Creanova shall propose to analyze all samples from 833 Magnolia Avenue for base neutrals with a forward library search (BN+15).

4. Creanova shall evaluate all tentatively identified compounds (TICs) and compare them to the NJDEP's interim generic criteria for synthetic organic chemicals lacking evidence of carcinogenicity (100 ppb maximum for an individual compound, and 500 ppb maximum total concentration) and to the applicable interim generic criteria for carcinogenic compounds (5 ppb for an individual compound, and 25 ppb for total compounds). Creanova shall determine whether the individual TICs exceeding 5 ppb are carcinogenic or non-carcinogenic so that the appropriate interim generic criterion can be applied. The source(s) of the information used in making this determination (e.g., IRIS, HEAST) shall be cited for each TIC evaluated.

5. After the installation of the above proposed monitoring wells, Creanova shall submit ground water contour maps which include water level data from the

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wells on both the main portion of the site as well as at the 833 Magnolia Avenue portion of the site.

6. Creanova shall submit maps which depict the extent of each of the ground water contaminants and document which monitoring wells are being used to document the limits of the contamination.

7. According to the NJDEP's January 5, 2005 letter, Nuodex, Inc. was required to submit a proposal to determine the downgradient extent for each contaminant that exceeds the Ground Water Quality Standards to the east/southeast of MW-10D, MW-13D and MW-22D, and to the south of MW-1D/1DD. That proposal was not included in the above referenced document. Rather, Creanova discussed hydraulic control issues which are different from the need to delineate the limits of the ground water contamination.

Please note that the failure to submit a document that complies with N.J.A.C. 7:26E and all the specific requirements or questions raised in the referenced NJDEP letter constitutes a violation of the original ACO, the RA Amendment dated January 11, 2002, and N.J.A.C. 7:26B. This violation will continue until all of the requirements are met. The NJDEP may assess a civil penalty for this violation pursuant to N.J.A.C. 7:26C-10.4.

8. It is the NJDEP's understanding that the Joint Meeting of Essex and Union Counties (JMEUC) has denied Creanova's request to discharge the treatment system effluent to the sewerage treatment plant. In addition, Creanova's proposal to reduce the volume of the ground water from the deep wells and combine it with a greater volume of ground water from the shallow wells in order to meet the toxicity limits is not allowable under the NJPDES-DSW permit. Therefore, Creanova shall submit a revised remedial proposal.

9. The NJDEP had received the site redevelopment plans dated June 10, 2005. According to the cover letter for those plans, Creanova has requested that the NJDEP confirm that the capping specification is sufficient for the site deed notice requirements. Please be advised that the submittal is considered premature due to the above issues related to the ground water remediation. In addition, the submittal not meet the requirements of the Technical Requirements for Site Remediation, N.J.A.C. 7:26E-8.1.

At the present time, Creanova, Inc. is advised that any planned development of the site shall consider the impact from vapor intrusion of volatile contaminants in the ground water on indoor quality of future buildings. Creanova, Inc. shall review the NJDEP's Draft Vapor Intrusion Guidance which is available at the following internet address:
www.nj.gov/dep/srp/guidance/vaporintrusion/vig_draft.htm

If you have any questions regarding this letter, please contact the Case Manager, Michael Buriani, at 609-633-1425.

Sincerely,

Maurice Migliarino, Section Chief
Bureau of Northern Case Management

c: K. Geller, BGWPA
Bruce Manganiello, ECM, Inc.

959270603